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Editorial Notes

Load Building

To counter electrical competition it is necessary for us to persuade consumers to install as many modern appliances as possible for all the varied domestic requirements. We are obliged, too, to offer these appliances for cooking, heating, water heating—and, we would add, lighting—on terms of a nature unthought of a comparatively few years ago. Out-of-date and unattractive gas appliances are the electrical salesman's delight. In the households where these exist, and they are many, he obtains a ready hearing, and he is able to make a telling comparison between such equipment and the all-enamelled chromium plated electrical appliances it is his purpose to persuade the consumer to employ. As an example of the type of competition we are called upon to meet, we may cite the practice of some electricity undertakings of offering a free sink heater with every electrical cooker installed, a practice only made possible, of course, by the relatively high charge made for current for lighting purposes. The initial cost of modern attractive gas appliances—the same thing applies to electrical apparatus—is not low, and these costs are inevitably tending to rise. Cash purchase of these appliances by consumers is the reverse of the general rule. Long-term hire-purchase at rates about equivalent to those fixed for simple hire is the order of the day. Faced with the type of electrical competition obtaining to-day we have no alternative but to afford these facilities.

This brings us back once again to the fact which we may be forgiven for reiterating that 85% of the population of this country is dependent on incomes of £5 a week or less, and that therefore the future of the Industry must depend on how well it can cater for the masses. On limited incomes people are being pressed every day to embark on the hire-purchase of all manner of goods, and, as we have pointed out before, we have competition not only from electricity and other fuels, but from wireless and a host of other trades and industries. The next consideration is that the gas appliances put out on hire-purchase terms will not be fully used, in other words the consumer will not obtain the proper measure of satisfaction from them, unless gas is supplied at a cheap rate, and gas can never be supplied cheaply if it is called upon to bear any substantial portion of the cost of appliances and the cost of their fixing and servicing.

In this connection Mr. Tennyson-d'Eyncourt, of the Tottenham and District Gas Company, put forward some interesting figures in a Paper before the London and Southern District Junior Gas Association last week. In this Paper the Author gave the results of an investigation to determine the load value of appliances as expressed by the consumption each represents. This basis is, of course, open to criticism; it takes no account of the incidence of the different types of consumption on the distribution system, no account of the difference in cost of satisfying heavy demands for short periods as distinct from a steady, continuous load. However, putting aside this consideration, the results of the investigation are interesting and not a little surprising. The way in which the Author tackled the problem was by "subtraction." He compiled the consumption statistics covering a period of twelve months of consumers in the same area, both ordinary and prepayment, having different groups of appliances installed in their homes. The consumer with cooker only was taken as the common factor. Then from the different combinations of appliances in use he arrived at the average consumptions in cubic feet per annum accounted for by each appliance. The cooker consumption he found to be 17,600 cu.ft. and the consumptions for a portable fire and a fixed fire 2,600 cu.ft. and 2,700 cu.ft. respectively. We suggest that the position of the fixed fire might have been stated—*i.e.*, whether in a bedroom or in a living room—and two sets of consumption figures given. However, we should not have expected such similarity in the load represented by a portable fire and a fixed fire.

Water Heating

STILL more surprising is the similarity between the figures of 5,000 cu.ft. for a sink heater and 5,300 cu.ft. for a single-point water heater—and a multi-point heater, at 6,600 cu.ft., accounted for only 1,300 cu.ft. more gas than the single-point. It is obvious that a minimum use is being made of the appliances installed. A little calculation is in this regard interesting. To raise a gallon of water from 50° to 140° F. requires, assuming a thermal efficiency of 80%, 875 B.Th.U. On this basis, and assuming that the heater is lighted each time water is needed, the quantity of hot water which could be drawn would amount to no more than 8 gallons per day. If we allow for the probability of the pilot light being in use

throughout the day, being turned off during the night, then only about 5 gallons of hot water would be available. It is to be questioned whether families can maintain a high standard of personal hygiene in such circumstances. Are not the figures given by Mr. Tennyson-d'Eyncourt vitiated by the fact that when a separate gas water heater is installed the cooker hotplate consumption previously employed for heating water is transferred to the water heater? This cannot influence the net result of the installation of the additional appliance, but it does affect the average consumption figures arrived at for the individual appliances, and a subsequent argument used by the Author regarding sales policy, to which we will refer later. For the gas ignited coke grate, by the way, an added consumption of 400 cu.ft. was given. This appears to us to be a very low figure.

Mr. Tennyson-d'Eyncourt also set out some figures of annual consumptions taken out recently for varying installations in about 400 houses on new estates, and for a new estate comprising 300 houses. There are two observations to be made about these figures. The first is that the average consumption for an installation comprising a cooker and a wash-boiler, given as 17,800 cu.ft., is increased to only 25,100 cu.ft. for a similar installation *plus* a multi-point water heater and two fires. The second point is that, by the subtraction method, we arrive at a figure of 1,300 cu.ft. per annum as representing the lighting load. The lighting fittings must be ultra-bijou, or is the cinema to blame?

Sales Policy

TURNING to sales policy, Mr. Tennyson-d'Eyncourt compared the cost of appliances and their installation with the net receipts from gas consumed in them. On the basis of the figures of consumption arrived at by his "subtraction" method, some of which we have given here, he considered what increase in price of gas would have to be charged if gas appliances were given away and installed free. He set out calculations for three typical appliances. He came to the conclusion that for use in a sink heater gas would have to be raised in price from 8·6d. to 20·72d. per therm to wipe off the cost of the appliance in five years; and in his view no costs of appliances should be chargeable to gas, though he qualified this view with the proviso that where electrical competition demands it any gas undertaking would be justified in hazarding a part of the potential profit from the sale of gas in order to obtain the business, or, rather, in order to prevent loss of business. We do not agree with the figures he put forward, but that is not our point here. The consumer must, in some way or another, pay for the appliances installed, and we think that it is unwise to induce a consumer of small means to enter into such a number of hire-purchase agreements that in the result he burns little more gas simply because he has not the money to pay for it. "Pay through meter" for appliances is, up to a point, sound salesmanship. Many sales would not have been effected had this plan not been adopted. But as a general policy we consider it unwise to burden the price of gas with the cost of appliances and their fixing. It results in the impression that "gas is dear" and it does not lead to the proper and satisfactory use of the appliances. There appears to be only one way to increased gas consumption. Afford consumers the best possible facilities for the acquisition of appliances, sell these appliances with an eye not on their immediate sale but on their ultimate use, and, above all, adopt some form of two-part tariff which will enable the consumer to substitute solid fuel by gas without incurring an all-in fuel bill greater than formerly, or at any rate, if it does exceed that sum, of an amount which the consumer is willing and able to pay for the added convenience and labour-saving of gaseous fuel.

Taking a broad view of the question of appliance sale and installation, there is, we suggest, a real need for a more uniform policy. As we have pointed out before in these columns, there is a wide difference between some undertakings' ideas of a reasonable profit on "fittings account" and the views of those whose policy it is to sell appliances at or below cost to secure the load. It would be salutary to examine more closely the charge for fixing appliances. In one form or another this item appears on the consumer's bill and colours his view of the installation. Do all sales executives know exactly what it is costing to-day in labour and supervision to fix, say, the average domestic cooker, gas fire, or wash-boiler in old property and in new dwellings? How many are content, where an inclusive price has to be quoted, to put on a fixed percentage; and how long do such percentages stand uncorrected to the incidence of district conditions which change far more rapidly to-day than formerly? We have mentioned previously a case in point where the standard fixing charge for any cooker was fifteen shillings. A recent analysis in that area showed that over a considerable number of installations the cost per cooker for fitter's time, material, and handling was under seven shillings. If to that we add, say, three shillings for supervision and contingencies, making the total a round ten shillings, we see what scope existed for adjustment in this particular case if questions of policy indicated the expediency.

Statistical analyses may point the way to necessary adjustments or revaluations. Only skilled management, however, can bring about real savings and reductions in overall costs—management, which, for example, employs the best methods of handling, storing, and transporting goods, ensures close liaison between the fitting shop and the sales department, and is careful in the recruitment, training, and supervision of staff.

National Sales Drives

THE announcement of the launching by the British Commercial Gas Association of a National Cooker Fortnight for the end of February will have been welcomed throughout the Industry. The results of the first Gas Cookery Week in 1937 will still be fresh in the minds of many, and there were very few undertakings who did not benefit materially either directly or indirectly from that initial effort. There have been campaigns from time to time on behalf of gas fires, water heaters, refrigerators, and other appliances; but this is the first National cooker "drive" to be organized over so long a period as a fortnight.

The public is, unfortunately, inherently lazy and temperamentally resistant to sales effort; in fact, propaganda has to be practically forced down its throat before it can be persuaded to "swallow" it. Economic and other reasons prevent the regular personal approach to every single consumer which is the ultimate desire of all gas undertakings, and such concentrated campaigns as this bridge the gap to a great extent and awaken the public's interest in what gas can really do. The main object of the campaign is to bring customers to the showrooms and do it within a limited period, so as to secure the maximum number of orders in the shortest possible time. To this end certain undertakings even allow attractive discounts on all appliances sold during the period

of the campaign, thus adding weight to the advertising which sets out to stimulate those who are in a position to buy new appliances but are still hesitating over the definite decision. The offer of a discount on all orders secured during a limited period will frequently turn the scales in such cases.

The maximum advantage from the campaign is obviously obtainable only by the unreserved support of every individual undertaking. The national advertising sponsored by the B.C.G.A. may start a train of thought in the consumer's mind; but this must be supplemented by energetic local action. Advertising depends for its success on repetition; an isolated message in a morning newspaper may produce an impression, but it is likely to fade quickly. Repeat the same message again and again and it will inevitably influence the mental attitude and finally the actions of those to whom it is primarily addressed. In a short-term campaign the message must be repeated with remorseless frequency, and if the message of the national advertisements is repeated and its effect reinforced by local advertising, by circular letters, by leaflets, by demonstrations, by films, lantern slides, window displays, personal canvassing, and by editorial press comments—then the net will be spread widely enough to catch all the customers who at any given time are ripe for buying. Advertising seeks to turn prospects into sales, and by establishing a time limit the note of urgency is introduced with a view to spurring on the undecided customer.

That Dangerous Word "Safe"

In accordance with the practice of previous campaigns, the B.C.G.A. are sending out a wallet of useful suggestions for local activities during the Cooker Fortnight—and all undertakings will do well to study these closely and so direct their policies to obtain the maximum results from the effort. The manufacturers of appliances, too, are co-operating, and doubtless many of the smaller undertakings will be glad to avail themselves of the proffered services of expert cookery demonstrators. The cookery demonstration is essentially an integral part of any such campaign as this.

Before launching out upon campaigns of any sort it is usual to speculate on the probable results. Fortunately, in this case it is not entirely a matter of "speculation," for the record is available of at least one previous national effort—and this only a week's campaign. In one large northern city the sales of cookers were 130% up on the same period the previous year; in another industrial centre, in spite of intensive effort over four years which had resulted in the fixing of well over 35,000 all-enamelled cookers, the sales directly due to the campaign showed an increase of 56% compared with the previous period. In a West Country town of little over 2,000 consumers local advertising and circularizing resulted in the sale of 70 enamelled cookers, while in another district of under 9,000 consumers 141 enamelled appliances were sold. Such figures, which are typical of many other districts, speak for themselves, and it must be remembered that they represent only the immediate and direct result of an intensive campaign. The effect of such an intensive effort does not end suddenly.

Unfortunately there are still undertakings which are satisfied to sit back and pretend to believe that their cooker load is "safe" without any further effort on their part. They deceive themselves, besides constituting another weak link in the whole Gas Industry chain. No load whatever is safe so long as out-of-date appliances remain on the district and electrical competition continues. Wherever the cooker load which was sold originally many years ago has fallen into disrepute through lack of proper attention, it must be sold again. Many undertakings which regard themselves as progressive would be horrified if they knew how many ancient appliances are still doing so-called service on their districts. Such appliances are a menace to the development of the Industry and an open invitation to the electrical canvasser. The object of such campaigns as the Cooker Fortnight is to replace them with up-to-date apparatus *before* the electrical canvasser gets in.

It is not our object here to discuss in detail how gas undertakings can best adapt the general campaign to local circumstances. Neither are we discussing the economic aspect, merely remarking that it may at times be found worth while to ignore the accountant's point of view in order to consolidate the cooking load and obtain a body of satisfied and proud consumers. For example, without necessarily upsetting the balance-sheet every undertaking can usefully consider the extension of hire-purchase terms to a quarterly charge equal to or less than the simple hire rates after which so many consumers still hanker—and this in addition to allowing cash discounts during the Fortnight. In considering whether the profit on a high-grade appliance should be sacrificed in whole or in part, it must also be borne in mind that not a few electrical undertakings supply and fit *free* cookers and other appliances, while others allow speculative builders to have mains and services without cost provided they install certain stipulated points and appliances in the houses. Moreover, the simple hire of electrical cookers tends to increase in ratio to the Gas Industry's efforts to curtail this system or withhold it altogether in respect of all-enamelled appliances. All these facts, and many more besides, must be kept constantly under review in order to maintain our cooker load in its proper perspective, never forgetting, above all, that the sale of a gas appliance is a means to an end, and not an end in itself.

The Composite Page

This is one of various names applied to a feature of journalism which, although completely *démodé*, still persists in certain quarters of the Press, and of which the Gas Industry is one of the favourite victims. Its most usual manifestation is in the form of a "write-up" of the local gas undertaking, which appears in the centre of a page of a provincial newspaper, and is surrounded by the advertisements of various makers of gas appliances. How and why the makers of gas appliances allow their advertisements to appear in such positions we can only surmise; in these days of enlightenment as to publicity values they can hardly believe that they obtain any return in proportion to their expenditure. At the same time, this fact alone would probably not unduly influence them, since it is well known that they do not count every penny expended as likely to bring its own return directly to the individual firm which expends it. Rather, regarding themselves as an integral part of a great Industry, they are prepared to lay-out large sums in advertising to the general benefit, knowing that their own prosperity can only be ensured by the progress of the Gas Industry as a whole. It is in this light that we ask gas undertakings to consider the whole matter, before they fall to the blandishments of the local press representative who offers a "composite" or "feature" page in connection with some such event as the opening of new showrooms or the inauguration of works plant.

According to the last Annual Report of the S.B.G.I., the

members of the Society had spent in one year over £400,000 on exhibitions, press advertising, and general propaganda. Vast as this sum of money may seem, it is important to remember that there is a limit to the size of golden egg which even the best of geese can deliver in the best of surroundings; and most certainly this condition is not well satisfied by flocking together on a composite page a number of advertisers who are in keen competition with one another in the same Industry.

The chief problem is, however, not how the geese shall be kept tractable, lest the whole flock fly away in one night, but how to make the best use of the assistance which is willingly proffered by the contractors' side of the Industry. Quite definitely the composite or feature page is bad publicity, and consequently a misapplication of valuable funds. Time was, not so many years ago, when reading matter and advertisements were more or less segregated on different pages, but if we look at our daily or weekly newspapers to-day we find an entirely different state of affairs. The advertiser has become wise to the fact that a solid phalanx of assorted advertisements is an offence to the eye of the reader, whereas the same eye may often be allowed subconsciously to stray from reading matter to the odd individual advertisement which stands alongside it. When, therefore, the reader's eye alights upon the framework or solid basis of advertising matter which constitutes such a large part of the so-called feature page, resistance is set-up, and the whole is dismissed as a rather blatant advertising "stunt." The story of the gas undertaking, upon which so much time has been expended, goes unread, and its latest achievements in the service of the locality remain unsung.

Why is it, then, that Gas Industry publicity in connection with local events continues to follow these methods of years ago? We believe it is very largely because the composite page forms an extremely easy get-out for local papers, which obtain extra advertising and are able to discharge the whole matter—editorial as well—in one solid lump in one issue. We cannot blame them so long as the gas undertaking is satisfied that it is getting the best possible publicity by such methods, but we do ask that consideration be given to the points we have mentioned and that the Gas Industry should cease to be featured so often by this out-of-date method. The Engineer and Manager is, after all, in a strong position. The local gas undertaking is quite definitely "news" all the time, and many know how to maintain such relationship with the local Press as gives mutual satisfaction all the time in ways far removed from the procedure outlined above.

To those in difficulty we can only repeat advice which we have given on many previous occasions. Dealing with the Press is one of the lines on which experts are employed by the B.C.G.A. Let them sort out your troubles for you, even to the obstinacy of the editor in the matter of a "feature" page.

Making and Selling

In an editorial comment under this heading published in the "Journal" last week an unfortunate printer's error resulted in the substitution of a line necessary for the development of an argument by another which rendered the immediate context meaningless. The slip was on p. 173, the line at fault being the tenth from the top in the right-hand column.

The comment was concerned with the relationship between manufacturing costs and the costs of gas distribution and sales. Having pointed to the economies which have been effected in manufacture during recent years we went on to say that: "Distribution costs have in the meantime increased. With new housing developments, with fewer consumers per mile of main, this, of course, was inevitable. The figures of *distribution costs given in Field's Analysis for* 1930 *and* 1936 are respectively 2·616d. and 3·308d. per therm." The words italicized constitute the line which should have appeared. As it was, the line read: "dustry is far better than it was even a decade ago." We apologize for this error, which is much regretted.

Tar for Roads in the North

There was an interesting discussion on the use of tar for roads at a meeting of producers and users of road tar held recently in Newcastle under the ægis of the Northern District Tar Board of the B.R.T.A. Dr. J. A. Roelofsen, of Dorman, Long, & Co., who presided, remarked that while of the total tar production of the country 20% was produced within forty miles from the place of the meeting, and while of that quantity some 600,000 tons was applied to roads in the whole country, only 5% of that amount of road tar was so used in Northumberland, Durham, and the North Riding of Yorkshire. To this, Mr. W. J. Merrett, Durham County Surveyor, replied that the material used in his County was in the range of 90% tar to 10% of bitumen, and that he could therefore not accept any suggestion that they were behind in the use of home produced material. The Northumberland County Surveyor, Mr. A. Cheyne, explained that in Northumberland a mixture of 90% tar and 10% bitumen was used exclusively, and he too could not see how much further they could go in support of home industries. On another point, he suggested it was unfortunate that with trade associations the specifications—particularly the British Standards Specifications—should be drawn up to meet the least efficient manufacturing unit. The time had come for revision of the British Standard Specifications for Tars. With this Mr. J. Davidson Pratt, Chairman of the B.R.T.A., agreed, and informed the meeting that his Association is busily engaged on a new specification. At the meeting Mr. W. J. Hadfield gave a *résumé* of the Paper he presented at the Public Works, Roads, and Transport Congress in November last, an extract from which was published in the "Journal" for Nov. 17. A film on the manufacture and application of thin tar carpets, made by the South Metropolitan Gas Company, was also shown. It will be remembered that the Company published a preliminary report on this development last September, an abstract from which we gave in the "Journal" for Sept. 15. On all grounds the Newcastle meeting was a success, and we are sure that the greater the co-operation between producer and user of tar—and it was the purpose of the meeting in question to foster such co-operation—the better it will be not only for the road tar interests but for the users of the roads themselves.

Heating Service

A useful Paper on "Town Gas for Heating and Ventilating" was read this month by Mr. F. Dickinson, Industrial Gas Engineer to the United Kingdom Gas Corporation, Ltd., at a meeting of the Manchester branch of the Institution of Heating and Ventilating Engineers; and a substantial extract from it will be found on later pages. The Author discussed the use of town gas for central heating, and his comments on the possible economies of operating the gas boiler continuously are interesting. Superficially this would appear to be an expensive proposition, but Mr. Dickinson's contention was that conditions may be such that a continuously operated boiler rated at, say, 150,000 B.Th.U. might prove cheaper to run than one rated at 450,000 B.Th.U. operated only during the daytime. Installation of the smaller boiler would mean that the initial heating period would be expended. But does that matter? asked Mr. Dickinson, and he suggested that it is better to warm up the system slowly than to force heat through at a fast rate when everything is cold. Within a day or two the brickwork would reach saturation point at the agreed room temperatures, and it is then only necessary to maintain these temperatures. If this is done, he argued, there is only the variation in outside temperature to cope with at night time. The residual heat in the body of the building will be practically static; there

is a loss through the glass surfaces, but there are fewer air changes during this period and the greatest heat input is usually to balance the air changes. A reduction in air changes from three per hour to one per hour will offset a considerable amount of outside temperature drop. The load factor, he continued, would probably be about 50% overnight on the low rated boiler, the room thermostat would control as in the daytime, and the overall costs would probably be lower than for a larger boiler which is run in the daytime only and has to offset the night losses during the first two hours of daily operation.

Water Storage at Higher Temperatures

Another interesting suggestion made by the Author is the feasibility of maintaining the storage of hot water at higher temperatures than is customary, on the assumption of having a well-lagged cylinder, with lagged pipes and reasonably short runs. There is something in his point that in practice, if the water is only about 100°-105° F. the tap is left full on all the time and about double the usual quantity of water is used, without the addition of any cold water. If the hot water is at about 180° F. the minimum quantity is used and plenty of cold water added. In the first case heat which has been expended to raise the water 55° F. is extravagantly wasted, and in the second case the heat expended to raise the water 130° F. is economically used. Mr. Dickinson expressed the view that unless the differential heat losses through the lagging are disproportionate at the two temperatures there would be a probable saving in fuel of about 15% to 20%.

Everything is to be said for the bringing-about of closer co-operation between our Industry and heating and ventilating engineers, and the Paper by Mr. Dickinson, which set out such a great deal of information, must have helped to foster such co-operation. He made it clear that the Gas Industry, with its many technical organizations, is anxious to collaborate with heating and ventilating engineers at all times. He pointed to the continuous association between the client and the gas undertaking after an installation has been completed. Owing to the automatic action of the gas-fired plant there is a tendency for the owner to forget that it is functioning until the account for gas is rendered. This is scrutinized carefully enough, often with a disregard of the weather variations and the like over the period in question. For any defects there may be a feeling that the responsibility rests with the undertaking, which is liable to be called upon to elucidate mysterious happenings due to radiator airlocks, failure to wind the clock control on Saturday night, and so on. A certain amount of this type of service is to be expected and in many districts a maintenance service has been established. In most instances this service is free. In other cases, for a nominal charge the boiler is inspected twice per season, and the whole of the gas equipment is examined and tested to ensure that it is in good order.

E.A.W. Kitchen Planning Competition

Entrants in the national kitchen planning competition organized by the Electrical Association for Women would be assisted in two ways by purchasing Walter King's "New Kitchens for Old" published at these Offices for the modest sum of sixpence. In the first place they would have a readable and stimulating guide as to how a labour-saving and attractive kitchen should be planned, and secondly they would doubtless come to the conclusion that gas equipment provides the economic solution. We suggest that the gas undertaking's effective reply to this E.A.W. campaign is to broadcast "New Kitchens for Old"—via gas.

Letters to the Editor

Salaries of Gas Engineers

SIR,—The Council of The Institution of Gas Engineers has noted with concern, from time to time, cases in which the services of a gas engineer are sought at an inadequate remuneration. It has always been anxious to see maintained for the gas engineer a status worthy of his training, and it has been able on occasion to make useful representation to this end.

The Institution of Gas Engineers possesses confidential data from which it has been able to draw up a scale indicating the range of salaries of engineers and managers actually in force throughout the Gas Industry. The Secretary has frequently been able, upon request, to give confidential advice to gas engineers as to the remuneration appropriate in stated cases, a service which has been and continues to be much appreciated.

Yours, &c.,
W. T. K. BRAUNHOLTZ,
Secretary,
The Institution of Gas Engineers.

1, *Grosvenor Place,*
London, S.W. 1,
Jan. 24, 1938.

SIR,—I have read with interest the letter by Mr. C. S. Shapley, of Leeds, which appears in the current issue of the "GAS JOURNAL," and I am particularly interested in the last paragraph in which he raises the important point of the formulation of a scale of salaries. I assume that Mr. Shapley agrees that such a scale should be arranged on a National basis, and I think a movement in that direction is long overdue.

During my association with the Industry the question has exercised my mind from time to time and particularly when I advocated improved salaries for those responsible for the conduct of the Edinburgh Corporation Gas Undertaking.

It is now the rule that municipalities are more and more encouraging the settlement of wages and conditions of their workpeople through the medium of Joint Industrial Councils, and in Edinburgh it is interesting to note that arrangements have been suggested and are at present under consideration for the lower paid members of the salaried staff being similarly dealt with. I am certain, therefore, that a movement in the direction suggested by Mr. Shapley would be in the interests of all concerned, and it has my wholehearted support.

Is this not a matter which should be examined by the British Gas Federation, where all interests in the Industry are represented?

The perpetuation of low salary rates can only have an adverse effect on the Industry as a whole, and the time is surely now overripe for the removal from public discussion of the salaries paid by municipalities to their chief officials. I hope that the day is not far distant when the Gas Industry will be in as strong a position as the British Medical Association in this connection.

In any movement with the object of having a national scale of salaries for the Gas Industry fixed I would gladly render any assistance which I possibly could, and I feel I speak for the majority of enlightened municipal administrators.

Yours, &c.,
WALTER MUTER,
Chairman of the Edinburgh Corporation Public Utilities and Past-President of the B.C.G.A.

City of Edinburgh Gas Department,
15, *Calton Hill,*
Edinburgh, 1,
Jan. 21, 1938.

Shanghai Gas-Works Under Fire

SIR,—The wonderful description, in your issue of Jan. 12, of the part played by the Engineers and Secretary of the Shanghai Gas-Works during the air raids and shell fire fills one with admiration of their heroic efforts.

Our attention has been particularly called to the part played by Peebles patent safety relief valve, which came into action when the foul main blow-off had jammed. This valve probably saved the plant from explosion or fire. It is described as a governor, which is hardly correct, as its duty is to relieve excess pressure on the retorts should a blockage occur.

In his Paper to The Institution of Gas Engineers in May, 1936, on the New Gas-Works at Shanghai, Mr. W. J. Baker, Chief Engineer, described the relief valve as of "inestimable" value in everyday use, and so it has turned out in a dire necessity.

Yours, &c.,
PEEBLES & CO., LTD.,
W. CARMICHAEL PEEBLES,
Managing Director.

Tay Works, Bonnington,
Edinburgh, 6,
Jan. 17, 1938.

Personal

Mr. ALBERT HITTINGER, Director and General Manager of the National Benzole Company, Ltd., has been appointed Managing Director. He has been associated with the Company since its inception in 1919, and it is largely due to his activities that it has grown to be one of the largest distributors of motor spirit in Great Britain.

* * *

Mr. WILLIAM R. GORDON, who has occupied the position of Director of the Coal Utilisation Council since its formation in 1932, has resigned that post, having been appointed Commercial Manager of Low Temperature Carbonisation, Ltd., and the group of "Coalite" and coal-oil companies presided over by Col. W. A. Bristow.

* * *

The Bolton Corporation Gas Committee on Jan. 17 appointed Mr. HAROLD PLATT, M.Inst.Struct.E., Assistant Gas Engineer to the Corporation, to be Engineer and Manager in succession to Mr. W. J. SMITH, who is retiring on superannuation.

Mr. Platt is 47 and, having been on the staff of West's Gas Improvement Company, Ltd., Manchester, as a Technical Draughtsman, he entered the service of the Bolton Gas Committee in 1924. He has been lecturer in gas engineering at the Manchester College of Technology since 1927.

* * *

Mr. S. J. INGRAM has resigned his appointment as Chairman and Technical Director of the South-Western Gas and Water Corporation, Ltd., but retains a seat on the Board.

Consequent upon Mr. Ingram's retirement, Mr. R. B. H. OTTLEY, Chairman of the United Kingdom Gas Corporation, Ltd., has been appointed Director and Chairman of the South-Western Gas and Water Corporation.

Obituary

We regret to announce the death of Mr. C. R. ALLENSBY, President of the Institution of Heating and Ventilating Engineers, from injuries received in a railway accident, on Jan. 21. Mr. Allensby was a Director of Messrs. Benham & Sons, Ltd.

Mr. A. B. Potterton, Past-President of the I.H.V.E., writes as follows:

The Officers and Members of the Institution of Heating and Ventilating Engineers deeply mourn the passing of their President, Mr. Charles Allensby, who died in such tragic circumstances on Friday last. When he met his death, he was travelling on the Institution's business—to attend the Annual Meeting of the Midland Branch to be held in Nottingham. The Secretary, Mr. C. C. Ferguson, who was accompanying him, was seriously injured.

Mr. Allensby was among the foremost in working for co-operation between the Gas and the Heating Industries and furthering the close relationship which is so much to be desired. He will be sadly missed both in commercial and social life, and the deepest sympathy is extended by all to Mrs. Allensby and her daughters.

Coke Oven Managers' Year Book

The Year Book of the Coke Oven Managers' Association for 1938 has now been published, and we are indebted to the publishers, Benn Brothers, Ltd., Bouverie House, 154, Fleet Street, E.C. 4, for the receipt of a copy. The latest information with regard to type of ovens, coke and gas produced and gas sold, as published in the report of the Secretary of State for Mines (1936), is given together with an additional table relating to coal washing plant. Another section gives some particulars relating to low-temperature carbonization. The publication continues to expand in circulation yearly, and it will continue to prove invaluable to all concerned with the carbonization of coal. A new feature, which will be useful, is the denoting of the section to which individual members belong by an initial letter in front of each name.

Forthcoming Engagements

January

27.—**Midland Juniors.**—Visit to Docker Bros., Paint and Varnish Manufacturers, Birmingham.
27.—**Southern Association of Gas Engineers and Managers (Eastern District).**—Meeting at Gas Industry House, 2.30 p.m. Discussion on "Some Notes on Works Practice." Committee, 12 noon.
27.—**B.C.G.A.**—Annual Meeting of Members in South Wales District, Cardiff, 3 p.m.
28.—**I.G.E.**—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
29.—**Scottish Western Juniors.**—Visit to Glasgow Corporation Lighting Department.

(There will be no meeting of the Central Executive Board of the National Gas Council or of the Central Committee of the Federation of Gas Employers during the month of January.)

February

1.—**I.G.E.**—Research Executive Committee, 2.30 p.m.
1.—**B.C.G.A.**—Annual Meeting of Members in South-Western District, Exeter, 2.30 p.m.
2.—**London and Southern Juniors.**—Visit to Watson House.
3.—**Midland Juniors.**—Meeting and Paper by G. Bakewell, of Birmingham, "The Sale of Coke for Domestic Purposes."
3.—**B.C.G.A.**—Annual Meeting of Members in Midland District, Birmingham, 2.30 p.m.
5.—**Scottish Eastern Juniors.**—Short Paper Meeting at Dunfermline.
5.—**Manchester and District Juniors.**—Meeting at Blackpool. Paper by T. V. Blake, "A Six Years' Period Prior to the Removal of Blackpool Gas-Works."
7.—**London and Counties Coke Association.**—Technical Committee, Gas Industry House, 2.30 p.m.
8.—**I.G.E.**—Finance Committee, 10 a.m.; Membership Committee, 11 a.m.
10.—**B.C.G.A.**—Annual Meeting of Scottish Members, North British Station Hotel, Edinburgh, 2.30 p.m.
17.—**S.B.G.I.**—Council Meeting at 56, Victoria Street, S.W. 1, 2.30 p.m.
12.—**Scottish Western Juniors.**—Meeting and Paper by E. Smith, of Dumbarton, "Stores Control and Job Costing."
14.—**W.G.C.**—Executive Committee, Gas Industry House, 2.30 p.m.
15.—**W.G.C.**—Training Sub-Committee, 10.30 a.m.
15.—**I.G.E.**—Gas Education Executive Committee, 2.30 p.m.
15.—**London and Southern Juniors.**—Meeting and Paper by E. W. B. Dunning, of the Gas Light and Coke Company, "The Relation of Design to Cooking Quality."
15.—**B.C.G.A.**—Annual Meeting of Members in Yorkshire District, Leeds, 3.45 p.m.
17.—**B.C.G.A.**—Annual Meeting of Members in the Southern District, Gas Industry House, S.W. 1, 2.30 p.m.
19.—**Scottish Western Juniors.**—Annual Whist Drive and Dance.
21.—**London and Counties Coke Association.**—Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m. Both meetings at Gas Industry House.
26.—**Yorkshire Juniors.**—Meeting at Barnsley. Paper by L. Friedman, of Ascot Gas Water Heaters, Ltd.
26.—**Western Juniors.**—Visit to Bristol. Paper by A. B. Horsfield.
26.—**Scottish Juniors.**—Joint Meeting at Edinburgh. Paper by Col. W. Carmichael Peebles on "Governors."

February 21-March 4.

British Industries Fair, Castle Bromwich.

Feb. 24.—Joint Visit of Junior Gas Associations.
Feb. 25.—Joint Visit of B.C.G.A. Salesmen's Circles.
Feb. 28.—Visit of Women's Gas Council.
Mar. 1-3.—Joint Gas Conference.

April

7.—**I.G.E.**—Joint Committee on Complete Gasification under Pressure, Fuel Research Station, S.E. 10, 11 a.m.
8.—**North British Association.**—Spring Meeting at Coatbridge.

A Lecture on Gas Water Heaters was recently delivered by Mr. T. B. V. Hirst, Assistant to the Chief Engineer, Ascot Gas Water Heaters, Ltd., to a large gathering of the Folkestone and District Ironmongers' Assistants' Association at the showrooms of the Folkestone Gas Company. The lecture was supplemented by lantern slides.

News of the Week

A Supply of Gas to the village of Newbold Verdon is being arranged by the Leicester Gas Committee, following a request from the Newbold Verdon Council.

All Gas Consumed in Excess of 4 million cu.ft. per quarter will in future be charged at 1s. 4½d. per 1,000 cu.ft. as a result of a recent decision of the Stockton-on-Tees Town Council.

The Journal and Transactions of the Society of Engineers for October-December, 1937, which we have received from the Society, includes an interesting Paper by Dr. Herbert Chatley on "Engineering and the New Economics."

The Following Tenders for the supply of gas meters have been accepted by Middlesbrough Town Council: Messrs. Alder & Mackay, Ltd., Edinburgh; J. & J. Braddock; Metropolitan Gas Meters, Nottingham; and Willey & Co., Ltd., Exeter.

"The Search for Oil" is the subject of a Paper to be read by Mr. John Roberts, D.I.C., M.I.Min.E., F.G.S., at a meeting of the Royal Society of Arts on Feb. 9. He will make special reference to the occurrence of petroleum in relation to the formation of anthracite.

The Official Visit of the British Junior Gas Associations to the British Industries Fair will take place on Thursday, Feb. 24. The Fair Management Committee has kindly issued a number of invitations to luncheon, and these will be allotted proportionately to the membership of each Association.

A Demonstration Theatre adjoining their existing showrooms has been erected by the Grantham Gas Company. The theatre is of red brick with a flat roof and has been designed to seat forty to fifty people. Miss M. L. Wilson has been appointed to the post of cookery demonstrator and home service specialist.

A Record Day's Output has been achieved by the Buckhaven and Leven Gas Commissioners. In his January report the General Manager, Mr. H. A. Aitken, informed the Commissioners that the highest output ever recorded for any one day was on Dec. 31, when 684,000 cu.ft. of gas was produced. This is 42,000 cu.ft. more than the previous record.

The Institution of Chemical Engineers are holding their Sixteenth Annual Meeting and Dinner at the Hotel Victoria, Northumberland Avenue, W.C. 2, on Friday, Feb. 18. Following the Presidential Address of Dr. William Cullen, Mr. H. J. Bush, M.Sc., Ph.D., will give a Paper on "Some Applications of Electrostatic Precipitation to Industrial Effluent Gases."

In a Paper delivered at a Joint Meeting of the Institution of Civil Engineers and the Institution of Chemical Engineers, Mr. A. Parker, D.Sc., M.I.Chem.E., dealt with the treatment and disposal of trade waste waters. He referred to the problem of gasworks effluents and the work of the research staff under the Liquor Effluents and Ammonia Research Committee of The Institution of Gas Engineers.

An Outbreak of Fire at the Works of the Wexford Gas Consumers' Company was quelled by the Local Fire Brigade assisted by employees of the Company. The outbreak was traced to a quantity of tar in a large tank, and for a while there was risk of the flames involving a gasholder containing about 160,000 cu.ft. of gas. The damage was slight and the fire was under control so rapidly that even nearby residents were quite unaware of the incident.

One of the Objects of a Special Order for which the Croydon Gas Company intend to apply to the Board of Trade under the Gas Undertakings Acts, 1920 to 1934, is to authorize the Company to raise additional capital by the creation and issue of sliding scale stock to rank *pari passu* with existing sliding scale stock or maximum dividend stock to rank *pari passu* with existing maximum dividend stock or of preference stock or wholly or partly by one or more of those modes.

To Mark the Centenary of the Cardiff Gas Light and Coke Company, to which reference has been made in these columns, an up-to-date thermostatically-controlled cooker was presented to the Company's oldest continuous prepayment consumer. The recipient was Mrs. J. Watts, aged 85, of Blanche Street, Cardiff. She has had an all-gas house supplied through a prepayment meter since 1903, being one of the first to be connected to the then new method of obtaining gas. The presentation was made at the Bute Terrace showrooms by the Chief Prepayment Clerk, Mr. A. E. Berridge.

Gas in Commerce and Industry was the subject of an article by Mr. W. H. Johns, M.I.Mech.E., Engineer and Manager, Swansea Gas Light Company, in an industrial supplement to the *South Wales Evening Post* on Jan. 21. In the course of the article, Mr. Johns drew attention to the very favourable terms on which gas is available to bakers at Swansea, and to the growing appreciation in the town of the advantages of gas-fired central heating.

The Unpopularity of All-Electric Houses was apparent from complaints voiced at a recent meeting of a tenants' association on a Bolton Corporation housing estate. Several tenants stated they could not afford to use the electrical appliances provided in "all-electric" Corporation houses. Councillor Tong replied that the Housing Committee did not intend to build any more houses of this class. In future the houses would have electricity for lighting and gas for cooking.

New Companies Registered during 1937 show some slight falling off as compared with the previous year. There was a recession of 1,020 in the total number (approximately 7%) and of £44,000,000 (or 27%) in the total nominal capital. Only two registrations appear to concern the Gas Industry—namely, the Cambrian Gas Corporation, Ltd. (£200,000, public), and the Gas Coke Export Corporation, Ltd. (£1,000, private). These facts and figures are revealed by the annual statistical report issued by Jordan & Sons, Ltd., Company Registration Agents, of Chancery Lane, W.C. 2.

Application to Borrow £11,000 for the erection of vertical retorts has been made to the Ministry of Health by the Lymm Council. It has been estimated that this new plant would effect an annual saving of £678. At a recent enquiry held in connection with the proposed loan, it was explained by the Engineer and Manager of the Lymm Gas Department, Mr. T. H. West, that three new retorts were proposed; each retort was to have a daily throughput of four tons of coal. The annual consumption of gas at Lymm was on the increase and in about seven years a new washer and purifiers might be necessary.

Representatives of the Local Authorities of Sutton and Cheam, Epsom and Ewell, Malden and Coombe, Surbiton, Carshalton, Esher, Merton, and Morden held a conference last Monday night to discuss the question of the uniformity of the standard of lighting on by-pass and classified roads and also the cost of lighting these roads. The meeting, which was held in private, had before it the Ministry of Transport's circular, dated Jan. 21, outlining the Ministry's proposals to contribute half the cost of the lighting of trunk roads. According to *The Times* the conference came to certain unanimous decisions which the delegates are reporting to their respective local authorities, after which a further conference will be held.

The London-Nottingham Express Crash led to the abandonment of the second annual dinner of the East Midland Branch of the Institution of Heating and Ventilating Engineers, which was to have been held at the Victoria Station Hotel, Nottingham, on Jan. 21. Both Mr. C. R. Allensby, President of the Institution, who died later from his injuries, and Mr. C. C. Ferguson, Secretary, who received serious injuries, were to have been the principal speakers. After the Loyal Toast, Mr. E. G. Phillips, Chairman of the Branch, announced the news of the accident, and the event was abandoned. Mr. Allensby, a Director of the firm of Messrs. Benham & Sons, Ltd., had been President of the Institution since last February.

The Messel Medal of the Society of Chemical Industry has been awarded to Dr. L. H. Baekeland, of the U.S.A. Dr. Baekeland is an outstanding example of a successful inventor, for he has lived to see the plastics industry, which he founded, turn over many millions of pounds a year with his own name perpetuated in the well-known commodity bakelite. Dr. Baekeland, as the scientist responsible for the Velox patents, is also one of the founders of modern photographic industry. The Messel Medal, one of the greatest honours in the profession of chemistry, is awarded every two years to one who has attained meritorious distinction in science and its application to industry. The Medal will be presented in Ottawa on June 21 during the Annual Meeting of the Society of Chemical Industry, which takes place this year in Canadian centres.

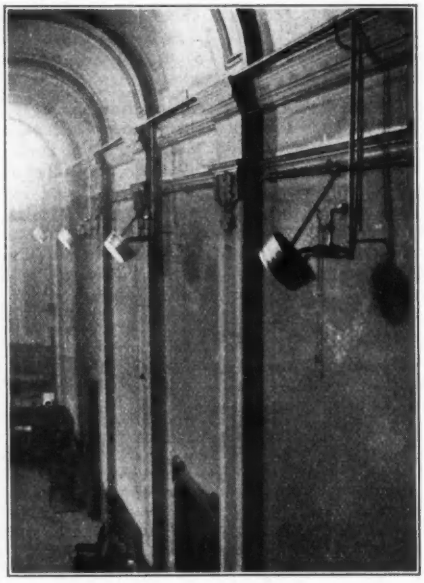
Radiant Heaters at Stalybridge

We are indebted to Mr. R. J. Restall, Engineer and Manager to the Stalybridge Corporation Gas Department for the following interesting particulars of the second installation of radiant heaters in Stalybridge, which has been in operation for several weeks and is giving complete satisfaction.

The volume of the hall being warmed is 79,000 cu.ft., and from a test during cold weather, details of which are given below, it was found that at an average consumption of 470 cu.ft. per hour—that is, approximately, 2½ therms, which at 4d. per therm costs 10d. per hour—it takes 5·9 cu.ft. of gas per 1,000 cu.ft. of space, or 140 cu.ft. of gas per 1,000 sq.ft. area.

Time.	Thermometers, ° F.					Meter Reading, Cu.Ft.	Consumption, Cu.Ft.	Remarks.
	1	2	3	4	5			
1 p.m.								Thermostat set at 56° F.
2 ,,								
3 ,,								
4 ,,	40	40	42	43	30	33,590		The temperature did
5 ,,	47	48	48	49	30	34,020	430	not rise sufficiently
6 ,,	50	52	51	52	29	34,500	480	to cause the ther-
7 ,,	51	54	52	54	29	34,950	450	mostat to cut out
8 ,,	53	55	54	56	29	35,400	450	and so at 10.50 p.m.
9 ,,	57	59	58	59	30	35,900	500	the heaters were
10 ,,	58	60	59	60	30	36,410	510	shut down by hand
11 ,,	60	63	62	63	30	36,700	290	
Total consumption							3,110	

From the figures given in the test which was made, on Dec. 18, 1937, it will be seen that the outside temperature, No. 5 thermometer, was actually below freezing point, and the radiant heaters required some time to attain a reasonable temperature. The dance that evening commenced at 7 p.m., and with the hall at 53° F. inside compared with 29° F. outside there was ample warmth with no discomfort. It has been found that it feels pleasantly warm in the rays of the burners, and that with the thermometers registering round about 58° F. ideal conditions are obtained.



Radiant Heaters in a Dance Hall.

The system is fully automatic and care is taken of every contingency. In this case the gas and air equipment was placed in the cellar, vibration noises being eliminated by the insertion of a specially made length of rubber tubing.

The fan works at one constant speed, and therefore continues to deliver a maximum quantity of air. Nevertheless, it has been found possible to cut out certain of the burners by closing the gas valve, and in cases where the burners are at the end of gas lines the independent constant volume governor at the burner allows of easy control to secure the same conditions at each point, thus giving uniform heating over the whole of the area.

The great advantage of such a system as this is that at very short notice places can be quickly aired, and within an hour or so are quite comfortably warm. The system may therefore be considered as excellent for supplementary heating.

Publicity for Dietetics

The Food for Fitness Exhibition now running at Charing Cross Underground Station, London, is the first of its kind, and has been organized by the Nutrition Display Committee, which is a panel of dieticians, and executed for them by the Gas Light and Coke Company. Mr. Robert Bernays, M.P., Parliamentary Secretary to the Ministry of Health, who was introduced by Sir David Milne-Watson, performed the opening ceremony on Friday, Jan. 21.

At the opening of the exhibition. *Letf to right.*—Mr. Robert Bernays, Sir David Milne-Watson, and Mr. S. C. Leslie, Publicity Officer of the Gas Light and Coke Company.

In the course of his remarks, Mr. Robert Bernays stressed the great need for more publicity on the question of food values, which the organizers of the exhibition were certainly doing their best to supply. He had said that food values needed more publicity, and particularly was this true of milk. If this exhibition taught those who visited it a better appreciation of the virtues of milk its organizers would have done great good. An important item in the Government's nutrition policy was to make people realize that milk was good for them; it was in fact essential.

Only half of the children to whom milk was offered under the Milk in School scheme, which he termed the greatest single nutritional experiment in the world, took advantage of it. Mr. Bernays concluded by congratulating the organizers of the exhibition on their work, and on behalf of the Minister of Health he extended them cordial thanks.

The number of Londoners bent on duty or pleasure who pass through Charing Cross underground station during any day is many thousands and since the exhibit is staged in the spacious booking hall one can readily appreciate its publicity value. The theme of the exhibition is an answer to those who ask if wise planning can help in a matter of such great national interest as nutrition. The exhibition shows that wise planning can definitely help. "The right cheap foods are as good for you as the dear ones" and "Foods that make you full may not be foods that make you fit" are typical of the slogans that urge the public to shop wisely. Many interesting and little known facts are revealed for the first time. For instance, with a little planning a badly balanced, and often popular, meal can become dietetically correctly proportioned. Again, how the child's diet differs from that of the adult; the child needs more body-building and protective foods and less energy foods.

Amalgamation and Grouping

United Kingdom and South-Western.

Close Brothers, Ltd., Secretaries of the South-Western Gas and Water Corporation, Ltd., announce that consequent upon Mr. S. J. Ingram's retirement from the position of Chairman and Technical Director (reference to which is made in our Personal column), Mr. R. B. H. Ottley, Chairman of the United Kingdom Gas Corporation, Ltd., has been appointed Director and Chairman of the South-Western Gas and Water Corporation, and arrangements have been concluded whereby the latter Corporation obtains the benefit of the technical and commercial resources of the United Kingdom Gas Corporation, Ltd., in the management of its Constituent Companies.

The Busty Seam

Fuel Research Survey*

The Report on the Busty seam of the Northumberland and Durham coalfield, issued by the Department of Scientific and Industrial Research, constitutes a comprehensive survey of an important seam over an unusually wide area, and forms part of the Physical and Chemical Survey of the National Coal Resources. The aim of this national undertaking is the provision of the data necessary for the utilization of our coal resources to the best advantage. The report under consideration is the forty-first of the series devoted to this survey and is the largest so far issued.

The Busty seam usually occurs in two distinct parts, and it was found expedient to deal with these separately, even where the separation only amounts to a slight parting, for elsewhere the separation becomes so great that the two parts are worked separately, sometimes under distinct names. The report thus is, in effect, a report on two seams. Further the Busty is not only of very widespread occurrence and importance throughout the Durham area of the coalfield but it is recognized and has been examined in the Northumberland area also. This necessitated the taking of a larger number of samples than usual, the results being given of the detailed examination, from floor to roof, of samples from as many as 56 sampling localities.

Each sample described is illustrated diagrammatically and full data are given. The determinations include proximate analysis, ultimate analysis, phosphorus and sulphur, calorific value, chlorine, fusion point of ash, and the yields on carbonization in the Gray-King apparatus. Ash analyses are given for a certain number of the samples.

In view of the large number of samples examined, and the extent of the area surveyed, the results of the work are summarized in seven groups chosen with regard to geographical position and chemical similarity. The limits of these groups are shown on the map on which the sites of the samples are indicated.

An interesting feature of the report is a map showing, by means of lines, directions in which the volatile matter content remains steady and conversely directions of maximum change of this important characteristic. This isovol map presents in a striking and easily assimilated manner the varying character of the seam across the area. Among other things it shows clearly the effect of two dykes of igneous rock that cross the southern part of the field, changing by heat and chemical reaction the neighbouring coal. This effect is discussed at some length, with analytical figures, in an appendix. Another appendix deals with problems of correlation and includes microspore distribution diagrams relating to a method of seam correlation by a study of the fossil plant spores separated from the coal in the laboratory.

It is expected that such a comprehensive survey of a seam forming a well-known horizon over so wide an area will serve as a datum, simplifying and reducing the work necessary on other seams in this field.

* "The Northumberland and Durham Coalfield—The Busty Seam." Fuel Research Survey Paper No. 41. Published by H.M. Stationery Office, price 6s. net.

A Cookery Class at Exhibition

Our photograph shows a Cookery Class in progress at the *News Chronicle* Schools Exhibition, reference to which was made in the "JOURNAL" for Jan. 5. The gas cooker shown is a Cannon "Champion," with glass door.

The Joint Gas Conference at the Fair

Programme

The following is the programme which has been arranged for the forthcoming Joint Gas Conference of the British Gas Federation, at the British Industries Fair, Castle Bromwich, from March 1—3 next.

Tuesday, March 1.

OFFICIAL VISIT OF INSPECTION OF THE EXHIBITS AT THE FAIR.

Wednesday, March 2.

10.15 a.m.	Assembly in the Conference Hall, British Industries Fair, when the Chair will be taken by the President, the Earl of Dudley, M.C.
10.30 a.m.	Official Welcome to Members by the Lord Mayor of Birmingham (Councillor E. R. Canning, J.P.).
	Reply by the Earl of Dudley, M.C.
	Presidential Address by the Earl of Dudley, M.C.
	Address by Sir Philip Dawson, M.P., M.Inst.C.E., M.I.Mech.E., M.I.E.E., entitled "SMOKE PREVENTION."
	Discussion.
1.0 p.m. for 1.15 p.m.	Official Gas Industry Luncheon in the Bradford Dining Room (adjoining the Conference Hall).
Afternoon.	Inspection of Exhibits at the Fair.

Thursday, March 3.

10.15 a.m.	Assembly in the Conference Hall, British Industries Fair, when the Chair will be taken by Mr. H. C. Smith, M.Inst.C.E., President of The Institution of Gas Engineers.
10.30 a.m.	Display of Gas Publicity Films.
Afternoon.	Inspection of Exhibits at the Fair.

Gas-Works and Air Raids

A Reassuring Statement.

A reassuring statement concerning the danger from gas-works and their vulnerability to air attack has been issued by Mr. J. Jamieson, Engineer and Manager of the Edinburgh Gas Department. In his statement, Mr. Jamieson affirms that the degree of danger from explosion or fire in gas-works can best be gauged by the fact that the premium charged by fire insurance companies is on the minimum scale. As a result of their experience, extending over many decades, and the statistical records of accidents, gas-works are regarded among the least dangerous industrial undertakings.

Having explained the circumstances under which gas will explode, Mr. Jamieson stated that it might be concluded that in the event of damage to mains, &c., by bombs or splinters, the escaping gas might ignite but would not explode except in very exceptional circumstances. This was proved conclusively during the great war. Shell splinters, as well as shells, generate on impact so much heat that gas is ignited immediately and it was known that of the large number of gasholders destroyed by artillery fire all of them burned out; no case of a gasholder exploding was recorded. About 500 men in the Department will receive air raid precaution training, and of these 300 will be located at the Works. The men on shift duty number 180, and the balance will form the emergency pipe, repair, fire, decontamination, and first-aid squads who will report for duty at the works on the air raid warning being given. In addition, an auxiliary fire station is to be established at the Works and extended first-aid accommodation provided.

Liverpool's New Gas Showrooms

"Radiant House"

OPENED BY

The President of the Board of Trade

The official opening of "Radiant House"—the new headquarters of the Liverpool Gas Company—took place on Monday, Jan. 24. The Rt. Hon. Oliver F. G. Stanley, M.C., M.P. (President of the Board of Trade), officiated, being supported by Mr. Frank H. Jones, M.Inst.C.E. (President of the South Metropolitan Gas Company).

The premises were thrown open to the inspection of the Liverpool public for one hour before the actual opening ceremony, and within a few minutes the great showrooms were thronged with sightseers anxious to inspect the beauties of the building and to become acquainted with the most improved form of gas consuming appliances. The completion of the building has occupied a period of two years and five months of work, the architect being Lieut.-Col. Ernest Gee, F.R.I.B.A., of Messrs. Quiggin & Gee.

It was a long task to complete a building fit to merchandise the universal products of the Liverpool Gas Company. So for two years and five months work proceeded in harmony and goodwill among principals, architect, and craftsmen.

Through the showroom windows of Radiant House—as it has been styled—can be glimpsed the four great columns of marble which support this mighty building, each carrying a weight of 750 tons, and measuring 11 ft. in circumference. Not without difficulty were these placed in position, for the sludge from a disused tributary of the Mersey had to be conquered. Five wells, the private water supply of five houses which originally occupied the site, were discovered by the demolition of the old building, but the concrete piles, driven deeply into the soft ground, ensure that the building will stand for all time.

Another difficulty accounted for by modern architectural practice was the fall on the street. This, also, has been discounted, and a close observer scarcely notices that the new headquarters of the Company stand four square in spite of being built on the side of a hill.

The golden quartzite used for the first time on the façade of an industrial building, relieved by delicate shades of green marble, is impervious to the chemical action of the smoke and grime associated with (not inseparable from) the life of a city. A balcony, fronted by a silver and coinage bronze grill, overlooks the name of the Company, and the massive pillars, in Swedish green marble, stand before an arcade where shoppers of many generations to come will stand on a non-slip quartzite pavement.

No need, then, for drabness in modern construction. Here is a building introducing both colour and modernity into ancient Bold Street, preserving the building line but losing nothing in majesty.

Ground Floor.

Revolving doors of bronze and glass, assisted, because of their weight, by a concealed motor, give access to the ground floor showroom with its area of 10,000 sq.ft. Soft toned marbles are used in the walls, and the mighty pillars stand on a travertine marble pavement. Natural light is provided by a well, rectangular in shape, and who ever thinks that gas had spent its day as an illuminant will experience a pleasant surprise when the artificial gas lighting in this magnificent showroom is switched on. Its soft brilliance, in contrast to the hard lighting of unnatural colour to which the public are half content to resign themselves, is particularly welcome. Colours remain true in gaslight, and, as the policy of the Company is to introduce colour into the houses of local citizens, this is an added advantage.

On each side of the Main Hall is a series of arches set back to illustrate designs in modern apparatus and, believe it or not, there is an aquarium. The water, in which play many types of tropical fish, is kept at a constant temperature by a gas water heater, operating under the control of a thermostat. Beyond the showroom, and also on the ground floor, is the Cashier's Department, whose staff work in an office no less handsome in spite of the prosaic nature of their function.

The lifts are robots—strictly impartial. When a customer wishes to travel to the fifth floor, while somebody else on the third floor wishes to descend, the lifts deal with each in the order in which they press the bell—everybody in turn—no favouritism here.

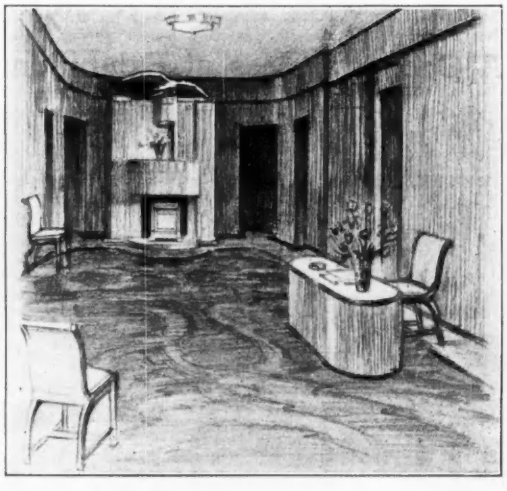
Basement Showroom.

A short flight of steps leads down to a veritable fairyland. The transition from soft marble to coloured glass provides a remarkable contrast. White fluted columns stand against the background of black and white glass walls, lined here and there with scarlet. Gas lighting again brings out the colours, and the same high standard of illumination is evident. Here, too, the floor is of unscratchable and undamageable quartzite.

In this showroom are examples of heavy-duty gas appliances. Even the gas-fired boilers and pumps, which condition the air of the whole building, are show pieces, set behind a movable glass screen.

Reception Lounge and Theatre.

On the first floor is a charming room which gives access to the Little Theatre. In this Reception Room is the Golden Eagle,



Reception Room.

completely restored, in a setting fit for his pristine brilliance. A massive fireplace of golden onyx surrounds a specially designed gas fire, and perched high above the unique mantel is the royal bird. Every art of the craftsman has gone to produce a room in keeping with the splendour of the mascot. The walls are of Aus-

tralian walnut, panelled from floor to ceiling, relieved by Macassar ebony. The carpet (sunk in the floor) is surrounded by parquetry.

Through the Reception Room one enters the Little Theatre. Three hundred people can be seated in comfort to see, hear, or take part in demonstrations, recitals, or plays. In addition, there is a projection room containing the latest type talkie machines to show any of the considerable library of films now held by the Company. The walls are relieved by a walnut dado, lined with ebony; the air is "conditioned" (as in all parts of the building), while gas floodlighting throws its mellow light across a false ceiling, completely concealing the source of illumination.

To this Reception Room and Theatre come housewives to discuss their household problems; educationists to view films on social matters; schoolchildren to see and hear the marvels of the manufacture of gas and the use of modern appliances; industrialists seeking the best way for heating a factory, setting up furnaces or feeding their workpeople. At all times will this huge Merseyside organization find expression in its ideal—service without smoke, dirt, or grime.

On this floor, also, are the offices of the principal administrators. Four floors are devoted to offices—all very handsome and comfortable. In the roof gardens, balconies, tea-rooms, dining suites, and modern office furniture, the policy of the Directors shows itself clearly. It has ever been the aim of successive Boards to house a happy and contented staff, all sharing in the fortunes of the Company and ready and willing to perform the tasks set them by a management which is never unreasonable.

Staff Kitchen.

The kitchen on the fifth floor is on permanent exhibition to the public. Glass and steel are the light materials chosen by the architect, and it would be less than just if this kitchen was not a show piece. Housewives and catering managers will search far and wide to find a more beautiful, cool, and efficient kitchen.

The sixth floor, surmounted by two of the tallest flag masts in Liverpool, houses the Board Suite.

It is "policy" which makes or mars business, and it speaks volumes for generations of Liverpool Gas Company Directors that their successive administration has brought the Undertaking to its present strong position. The price of gas in Liverpool, Bootle, Crosby, Litherland, Huyton, and district is nearly the lowest in the country, and it is certain that the policy will not be altered to accommodate unsound schemes to achieve spectacular increases in the sale of gas at the ultimate expense of the consumer. The test of soundness is the amount of capital invested per consumer. In the case of the Liverpool Gas Company it is £18—an exceedingly low figure.

Technical Features.

Heating.—The building is warmed throughout by the low-temperature invisible panel system, selected on account of its hygienic, economic, and architectural advantages. The temperature in each room is automatically maintained to meet individual requirements by means of the magnetic valve system of thermostatic control. The supply and extract system of ventilation is concealed in the structure, and provides the building with a constant interchange of filtered and tempered fresh air. The boiler plant, dealing with both the panel warming and fresh air supply systems, is situated at one end of the basement showroom, enabling those who may be interested in boiler plant to inspect and fully appreciate the advantages of modern gas boilers for central heating and industrial use.

The performance of the plant is indicated and recorded on a control cubicle in the centre of the boiler room and from this point one is able to note the conditions obtaining in all representative positions of the building and the functioning of the boilers and incidental apparatus connected with the heating and ventilation. The casing of the plant, in planished and stainless steel, provides a permanent high-class engineering finish, and has both an enhancing and protective value.

Pneumatic Tubes.—The longest pneumatic tube in the country passes messages to and from the new building to the Engineers' Department in Duke Street. Tubes are also available for inter-departmental use, controlled by a central station on the first floor.

Telephones.—There are two systems. Public telephones on a 30-line switchboard have 66 internal extensions, 19 of these being in the Duke Street premises, and 47 in Bold Street. Departments in Radiant House will communicate with each other by means of 39 dictograph instruments.

In Brief.

Area of site, 1,200 sq.yd.
Weight of structural steelwork, 850 tons.
Area of floors, 1¼ acres.
Weight of marble used, 220 tons.
Weight of quartzite used, 200 tons.
Length of ducting for air conditioning, 5,340 ft.
Total air capacity treated, 1,000,000 cu.ft.

THE OPENING CEREMONY.

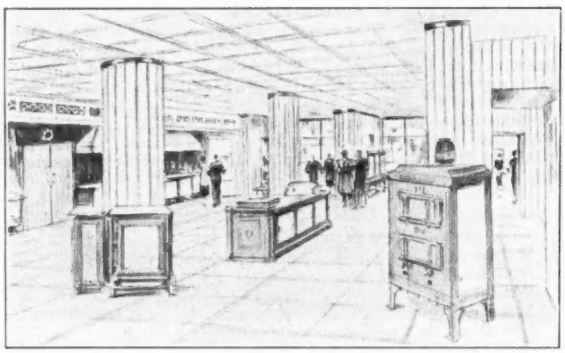
The opening ceremony took place in the Little Theatre. Upon the platform, in addition to the President of the Board of Trade, were Sir Christopher Clayton, C.B.E., Ph.D., F.I.C., J.P. (Chairman of the Liverpool Company), the Lord Mayor of Liverpool (Alderman Michael Cory Dixon, C.C.), and the Lady Mayoress.

The Rt. Hon. OLIVER F. G. STANLEY, M.C., M.P., desired, at the outset of his remarks, to state that he was not a gas expert. It did not need a gas expert, however, to go round the magnificent premises of Radiant House and to see what wonderful new opportunities were being offered to the consumer, and how progressive the Liverpool Gas Company had been; and, lastly but not least, how unselfish they had been in offering such new facilities and in endeavouring to foster the development of the Industry. On his way to Radiant House, Sir Christopher Clayton had mentioned to him that he was afraid some people might criticize the building as being too ornate. He thought, however, it was a wise policy to display all the resources of gas consuming science in a modern setting. From the glimpse he had had of the architecture and of the decoration of the building he was sure there could be no better setting for the exhibition of such appliances. It was a

The Ground Floor Showroom.

revelation to walk round the building and bear in mind one's childhood's idea of gas. To recall the jet which was never clean, only half of which used to burn, and which used to explode when a match was put to it, and go out when the match was taken away. It was a revelation to see what immense strides the Industry had made in the past few years, and what an immense range of facilities could now be offered to the gas consumer.

He could, if he had time available, make quite a long speech concerning the advantages of gas. It would be an eloquent and, he thought, an instructive speech; and it would come very easily to him because he used to make exactly the same speech when he

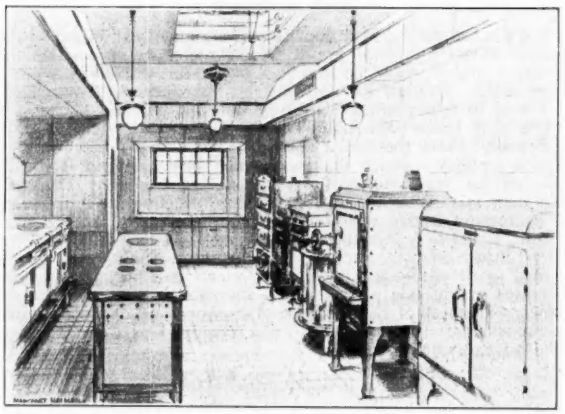


Basement Showroom.

was at the Ministry of Transport and had to boost electricity! But, seriously, he did not think there was any unnecessary rivalry between the two industries. They were not necessarily exclusive at all. They were complementary, and each had its best and its most economical use. He could think of no sign of greater hope for the future of the Gas Industry than that Liverpool should have a Company so progressive and so far-seeing as to embark upon an enterprise the initiation of which they were celebrating that day. It was therefore with the greatest pleasure, and with the best wishes for the future success of the Liverpool Gas Company, with every congratulation to the Board of the Company for their enterprise, to the architect for his skill in designing the structure, and to all who had taken part in the work for their assistance, that he declared Radiant House formally opened.

Sir CHRISTOPHER CLAYTON said he was extremely pleased that Mr. Stanley had come to open Radiant House. Moreover, he was extremely pleased that in Mr. Stanley's advancement in the Government that gentleman had now reached the Department which dealt with gas. The Chairman explained what use they were going to make of the Little Theatre. First of all, there would be cookery demonstrations given on the platform in full view of the audience below. Then there were certain instruments which looked like clocks, one on either side of the platform; one showing the amount of gas being used, and the other the time taken to carry out the actual demonstration. By means of them the audience would be able to check everything that went on. Another use to which the Little Theatre would be applied was that of a cinema. Pictures would be shown illustrating the various aspects of the Gas Industry, and there would even be "talkie" films exhibited. Furthermore, films would be shown occasionally which had nothing whatever to do with gas. There would be three cookery demonstrations per day, one of them being held in the evening for the benefit of women and girls who were at business in the daytime.

In addition, there would be six demonstrators engaged in what was termed the "Home Service Department." These demonstrators would go round to the people who had bought appliances and teach them how to use them; at the same time offering them advice as to the best kinds of food to purchase in regard to nutritive qualities. In this regard the Liverpool Gas Company were working in very close collaboration with the Medical Officer of Health for Liverpool.



The Kitchen.

New Books

Handbook on Flues*

This book, the first portion of a manual devoted to flue systems, covers the theoretical aspects of the subject. It has been published with the support of a Committee of the Association of German Manufacturers of Metal Stoves, an organization affiliated to the German Association of Gas and Water Engineers.

According to the Preface, it was the state of obscurity prevalent as regards the subject of waste gas evacuation even in technical circles which gave rise to the preparation of the treatise. Progress in the construction and use of cooking, water heating, and direct heating appliances is intimately linked up with improvements in waste gas evacuation, but guiding principles for the improvement of flue installations can only be formulated if there is a proper appreciation of the flow phenomena of the waste gases. To this end, great stress must be laid on the unequivocal nature of the fundamental conceptions.

It is stated that the preparation of a second volume devoted to the practical aspects of the design, construction, and requirements of flues for domestic and industrial furnace systems is contemplated.

The present volume opens with a discussion of the flow phenomena involved in the evacuation of waste gas and depending on differences of pressure and/or specific gravity or on the application of kinetic energy. A few special cases are next considered in the light of the theories propounded in the earlier section. Practical aspects such as the measurement of temperature and pressure drop and the calculation of basic data such as volumes of air and of waste gas then receive attention. The effect of the height of the installation above sea-level and of the cooling of the waste gases in the flue, as well as the influence of friction, forms the subject of a further chapter which is followed by a description of the use of models for the study of the mode of operation of chimneys. A final chapter is devoted to definitions, symbols, and units and their proper significance, and the explanation of certain terms which are often loosely used in practice.

The method of treatment of the subject is extremely logical and the Author has devised, for the representation of the temperature, volume, specific gravity, and pressure conditions of an assembly embodying a furnace and flue, a diagrammatic system which should prove very helpful to all who have to deal with the installation of appliances consuming either solid or gaseous fuels. It may, incidentally, be mentioned that the utility of the method is not confined to simple systems, as is evidenced by the inclusion of an example of its application to the combustion system of a regenerative carbonizing plant.

The Gas Industry owes a great debt of gratitude to the German Association of Gas and Water Engineers for their sponsorship of this work, which, when completed by the publication of the second volume, will prove of inestimable help in the design of flue systems of all types. There has been far too much trial and error in the past, though such methods are gradually being replaced by design based on scientific and aerodynamic principles with consequent increase in the prestige which gas appliances command.

* Schornstein-Handbuch, by E. Schumacher. I Band: Die Theoretischen Grundlagen. [Munich and Berlin, 1936, R. Oldenbourg. Pp. 141 with 38 diagrams and portfolio of 6 loose plates. Price RM. 6 unbound, RM. 7 bound.]

Women's Gas Council

Training Committee.

A Training Committee has been appointed to standardize the syllabus for the various training courses which are at present being contemplated by training colleges throughout the country. Representatives of the Association of Teachers of Domestic Subjects, the Battersea Polytechnic, King's College of Household and Social Science, the B.C.G.A., Institution of Gas Engineers, and an assessor from the Board of Education, together with certain members of the Women's Gas Council Executive Committee have consented to serve on this Committee.

Progress of Shrewsbury Branch.

The annual meeting of the Shrewsbury Branch of the Women's Gas Council was held on Jan. 19, when Mrs. M. W. Cock presided. Mr. C. M. D. Belton, Engineer, Manager, and Secretary of the Shrewsbury Gas Light Company, welcomed the visitors.

Miss Turner, Secretary, presenting the annual report, welcomed Miss Wilson, Assistant to Miss Halpin, Organizing Secretary, who gave a short Address. Last year they had enrolled 124 members, and the numbers had now swelled to well over 200. Mrs. White had presided during the year, and Mrs. Belton, Mrs. Gee, Miss Bromley, Miss Dawson, Mrs. Benger, Mrs. Inions, Mrs. Ridgeway, Miss Simpson, and herself had all served on the Committee. Mrs. White had unfortunately been compelled to resign, and Mrs. Inions had consented to take her place.

Among the activities of 1937 had been a whist drive, a health lecture by Dr. Symons, a lecture by Miss Earl, an outing to Port Sunlight, a tour of the Gas-Works, a talk on interior decorating, and many cookery demonstrations. Mrs. Cock expressed her thanks to all the workers, particularly Miss Turner.

Miss Wilson said that the membership of the Council was now 7,500, and there were 43 branches.

The Committee was re-elected, with the exception of Miss Bromley, who had resigned, Mrs. Williams being elected in her place.

Domestic Services Exhibition.

Miss Wolseley-Lewis, Chairman of the Women's Gas Council, was in the Chair at the Monday afternoon session of the Conference held in connection with the Domestic Services Exhibition, when Miss M. Pearson spoke on "What to Eat and Why." In introducing Miss Pearson, the Chairman gave a short account of the work of the Council and of the help given by the Gas Industry in improving national conditions, both in housing and nutrition.

The lecturer gave an account of the different foods and their work in nutrition, and gave her audience a list of the essential foodstuffs in a well-balanced diet. During the week talks have been given every afternoon on "How the Women's Gas Council Helps the Housewife," and parties of members from branches in or near London have visited the exhibition.

New Branch at Littlehampton.

On Friday last Miss Halpin attended the Inaugural Meeting of the Littlehampton Branch of the Women's Gas Council. The Chair was taken by Mr. P. E. Browne, General Manager of the Brighton, Hove, and Worthing Gas Company, and Mrs. Clowes, M.B.E., Chairman of the Brighton Branch, addressed the large audience in the Company's attractive new demonstration room when over fifty members were enrolled.

Athletic and Social

Cambridge Recreation Club Dinner and Dance.

The happy relations existing among the staff and employees of the Cambridge University and Town Gas Light Company were much in evidence when the annual dinner and dance of the Recreation Club was held on Jan. 15, more than 220 members and ladies being present. The Chairman of the Company, Mr. J. F. Cameron, presided, and was supported by Mrs. Cameron and the following Vice-Presidents, Mr. F. J. Dykes, Director, and Mrs. Dykes; Major H. McCombie, Director, and Mrs. McCombie; Mr. H. T. Wing, Director, and Mrs. Wing; Mr. Guy Dale, Director, and Mrs. Dale; Mr. J. Hunter Rioch, Engineer and Manager; Mr. A. E. King, Secretary; Mr. W. G. Bradford, Accountant, and Mrs. Bradford; and the Assistant Engineer, Mr. H. R. Thomas, and Mrs. Thomas.

The Loyal Toast, having been honoured, "The Cambridge University and Town Gas Light Company" was proposed by Mr. H. R. Stanley, who spoke of continued developments in pursuit of a policy of providing the highest quality and utmost value. The well equipped laboratory was now completed and the new coke plant in operation, while the re-organization of the Sales and Distribution Departments had proved very successful. Service, coupled with team spirit, was continually being preached by Mr. Rioch, a spirit which he encouraged by his support of the Social and Recreation Club.

Replying, Mr. F. J. Dykes spoke of public lighting, claiming that the achievement of the Company was a valuable contribution to the safety of the town.

The importance of a recreation club to industry was emphasized by Mr. Guy Dale in proposing the toast of "The Recreation Club and its Officers." From his personal experience as President of the Cambridge and District Bowls League, he could state that the Gas Company's team was held in high esteem by the League.

Mr. H. G. Kirby replied for the Club, observing that he was glad to think that the Club was serving a useful purpose in the life of the Cambridge Company. The help and support which had been forthcoming from the Directors and the Engineer and Manager had been greatly appreciated.

In a brief speech, Mr. Rioch warmly welcomed the pensioners. Alluding to the recent introduction of the *Cambridge Gas Bulletin*, he thanked the Directors for making its publication possible.

A tangible expression of thanks for the long and valuable service rendered to the Recreation Club by Mr. William Baker, took the form of an armchair which was presented by Mr. Cameron during an interval in the dance programme. Thanking the members, the late Secretary said how much he had enjoyed his term of office, and appreciated the support which had been accorded him. The remainder of the evening was devoted to dancing with music provided by Percy Read and His Band, and a cabaret presented by Michael Walsh.

Shrewsbury Annual Social.

A pleasant evening was spent by members of the Shrewsbury Gas Light Company's staff at their annual social on Jan. 19, when the guests included the Directors of the Company and representatives of the official and business life of the town.

Mr. C. M. D. Belton, Engineer, Manager, and Secretary, was in the chair and proposed the toast of "The Guests." He first of all made sympathetic reference to the death of Mr. W. R. Capper, a familiar figure at previous staff parties, and proceeded to touch in happy vein on the personalities of various guests and their direct or indirect connection with the Gas Industry. Among those mentioned were Mrs. White, Chairman of the Women's Gas Council; Mr. William Adams, Chairman of the Company, whom he wished many more years of health and activity; Mr. Frank Gee, Borough Treasurer, who, Mr. Belton said, collected something like a 2¼d. rate from the Company, or a halfpenny a therm; and Mr. Dennie Woods, Bursar of Shrewsbury School.

Mr. A. G. Chant, County Architect, who is responsible for the new Technical College, suitably replied, describing himself as a satisfied consumer who welcomed the opportunity of meeting the staff in their more informal moments.

"The Shrewsbury Gas Light Company" was proposed by Mr. A. E. White, Principal of the Technical College, who said the Undertaking was not one of those which flourished for a time and then entered upon a period of decline. Though well on in its second century, it was never more prosperous. This he attributed to the wide outlook of the Directors and the enterprise and efficiency of Mr. Belton and the staff.

Mr. Adams, in reply, recalled a boyish experiment in the early '60's, when he produced coal gas with the aid of a churchwarden pipe, and claimed to be the oldest manufacturer of gas present! The Company, he said, was still going strong, and while the Directors claimed some credit they acknowledged the zealous work of the staff.

A short whist drive followed, Mr. C. Crane acting as M.C. Mrs. Belton presented prizes to: 1, Miss Morefield; 2, Mrs. Crane; Consolation, Mrs. York. 1, Mr. Hollinrake; 2, Mr. Wainwright; Consolation, Mr. Young.

South Suburban Children's Party.

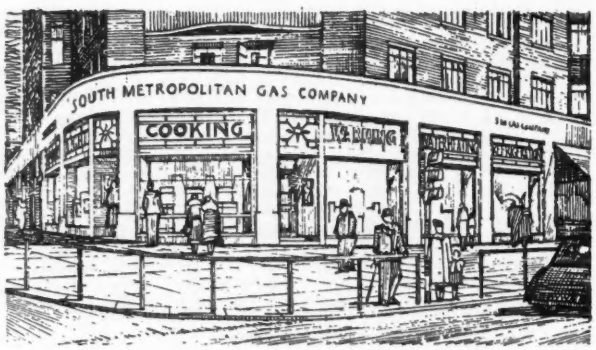
Over 150 children of employees of the South Suburban Gas Company were entertained recently by the Suburbagas Social and Athletic Club at the Bromley Common Social Club. The famous "slide" which is always brought into use on such occasions was as popular as ever. After an excellent tea, Father Christmas paid a visit to the party and presented a toy to each child. Games followed and subsequently ventriloquism and conjuring. On leaving, each child received an orange, an apple, and a bag of sweets.

The Committee responsible for the arrangements comprised Mr. T. H. Day (Chairman), Mr. W. E. Hickmott (Hon. Secretary), Mr. F. Ancel, Mr. W. M. Judd, Mr. G. V. Manley, and Mr. G. Thomas.

Classified Advertisement Rates, as shown on p. 200 of the "JOURNAL" for Jan. 19, were incorrectly stated. The rates for that week's issue were the same as those given in the Publishers' Notice of previous issues of this year, and as stated on p. 266 of this issue.

New Showrooms Opened at Streatham Hill

The opening last Friday by the Mayor of Wandsworth of fine new showrooms for the South Metropolitan Gas Company on a magnificent corner site at Streatham Hill marks yet another milestone in the history of an Undertaking which has supplied this district—now part of the largest Borough in the Metropolis—with gas for more than a hundred years.



An Impression of the Exterior.

Since gas first came to Streatham time has, it is true, brought many changes—and during no period have those changes been so marked as in the past few years. Its development from a quiet seclusion, with pleasant memories of Dr. Johnson taking tea with Mrs. Thrale, into a densely populated and busy suburb has been rapid and still continues.

To meet the increasing demands which such development make upon a public utility undertaking, the South Metropolitan Gas Company has opened these—its sixteenth—showrooms in the important shopping centre of Streatham Hill. The site is a splendid one—on a corner facing Streatham Hill Station—and the Company's Architect (Mr. W. Watson, A.R.I.B.A.), by designing the premises to conform in style to the general characteristics of modern tastes and requirements, has preserved the architectural features of the immediate neighbourhood.

Owing to the weight of building to be carried above the premises, there were numerous beams in the ceiling which have been hidden by the reconstruction of a false ceiling, and by this means it was possible to construct the laylights which so admirably light the centre of the showroom. The Company have found the Noel floor particularly satisfactory for showrooms as it is decorative, non-slip, and will yet stand up to such things as cooker feet which normally badly mark the average floor.

The illuminated fascia is prominent both by day and by night. It is illuminated by about seventy "Supervia" lights at approximately 2 ft. centres connected to flues which ventilate by natural means behind the parapet. The lights not only illuminate the fascia but also the appliances in the windows and the interior.

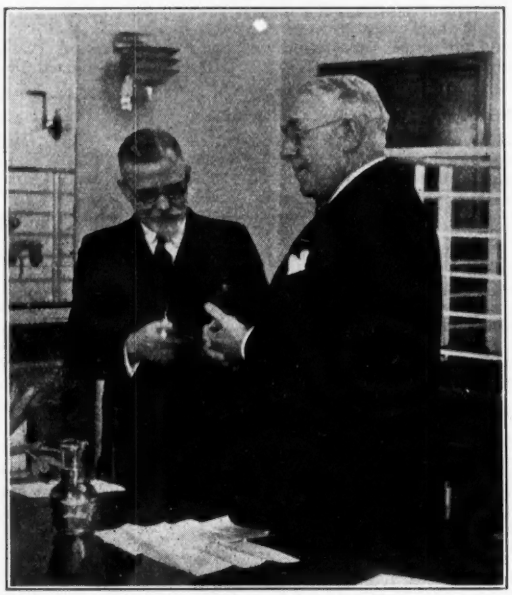
The showroom windows are of the "open" type, so that the whole of the interior can be seen from the pavement. The colour scheme of the interior is in a harmony of walnut and gold, while the indirect lighting, which is, perhaps, the most modern feature of the design, is employed to bring out the natural warmth of the colours.

The tasteful layout of the various gas appliances is a pleasure to the eye, and the growing realization of the need for more colour in the home is evidenced by the many attractive finishes to be seen on every side. Indirect lighting is provided through laylights in the ceiling and above the windows, while beautiful pendent fittings provide additional illumination, these being especially ventilated by means of ingenious circular vents in the ceiling above the fittings. Modern gas fires in tiled surrounds indicate that the service of gas heating extends to the whole fireplace and not merely to the fire itself. The water heating display is particularly noteworthy, being arranged in semi-circular form facing the main doors. Various representative appliances discharge their hot water into a common stainless steel trough. At the back of the showroom is a counter for the payment of accounts.

The new showrooms replace older premises some little distance away and provide facilities of which Streatham consumers may well be proud.

The opening ceremony was performed by His Worship the Mayor of Wandsworth (Alderman G. F. Morris, J.P.) in the presence of Lieut.-Col. G. F. Doland, O.B.E., J.P., Member of Parliament for the Balham and Tooting Division, and Mrs. Doland, local Aldermen, Councillors, and officers of the Borough Council, the Rector of Streatham (the Rev. Canon D. M. Salmon), prominent residents, including representatives of the Ratepayers' Association, the Chamber of Commerce, and the local Rotary Club, Mr. C. M. Croft (Chief Engineer and General Manager of the Wandsworth and District Gas Company), and others. The South Metropolitan Gas Company was represented by the President (Mr. Frank H. Jones), Mr. A. M. Paddon (Vice-President), and the following Directors—namely, Mr. H. Gundry, Mr. A. B. Pasmore, Mr. V. Hewes, Mr. J. D. Payne, and Mr. A. Lee—together with senior officers of the Company, including Mr. E. V. Evans (General Manager), Mr. A. H. Andrews (Chief Engineer and Works Manager), Major F. J. Bywater (Comptroller and District Manager), Mr. F. G. Brewer (Secretary), Mr. A. S. Holden (Assistant Secretary), Mr. R. N. Barnett (Chief Accountant), Mr. A. B. Seton (Sales Manager), Mr. Dean Chandler, Mr. W. R. Scriven (Local Manager), Mrs. A. L'Epine Smith (Lady Superintendent), and others.

Introducing the Mayor, Mr. FRANK H. JONES mentioned the wonderful site which they had obtained for their new premises in this rapidly growing Borough. They were very grateful to the Mayor for assisting them to launch their new venture in an area in which they had long desired to provide greater facilities for their consumers. As a memento of the occasion he asked the Mayor to accept a silver key and once again thanked him and the other representatives of the Council for their presence.



The President of the South Metropolitan Gas Company presents the Mayor of Wandsworth with a silver key as a memento of the occasion.

In declaring the new showrooms open, the MAYOR referred to the honour which the Company had conferred upon him in asking him to perform this duty. He imagined that these premises represented the last word in showroom design; they would delight the eye and excite the admiration of the ladies of the district who, he thought, would comprise the major proportion of their visitors. He had the greatest pleasure in declaring the showrooms open, and he hoped they would benefit not only the Undertaking but also the consumers.

The company thereafter adjourned to the Ice Rink, Streatham, where luncheon was provided at the kind invitation of the South Metropolitan Gas Company—Mr. JONES presiding.

In proposing the toast of "The Mayor, Aldermen, and Councillors of the Borough of Wandsworth," the CHAIRMAN referred with pleasure to the presence of so many distinguished guests, whom they were very proud to have with them on that occasion. Streatham was a very important part of the Borough of Wandsworth, and it was also a very important part of the South Metro-

politan Gas Company's area of supply. During the past few years great changes had taken place in Streatham under the wise guidance of the Council; particularly had the latter paid great attention to the type of building which was erected in the Borough, and there was no evidence in this district of such "monstrocities" as were often seen going up elsewhere. The Borough was an example, in fact, of wise town-planning.

Having acquired the site, the Gas Company felt that something rather special should be done in the way of showrooms. They were proud of the result—and they hoped their pride was well founded. It was a cause for great gratification that the Mayor and Councillors of the Borough should be with them that day to give their blessing to the Company's new venture—a venture which was intended to be of benefit not only to the Company but also to the consumers who would use it. It was the Company's aim to increase the comforts of the home, just as this was also the aim of the Council. In asking them to honour this toast, Mr. Jones thanked the Mayor once again most heartily for his presence there that day to assist them to start their new showrooms.

In responding to the Toast, the MAYOR complimented the Company upon the beautiful premises he had been allowed to open that day. He was quite sure that the reactions of the ladies of Streatham when they saw the wonderful things exhibited in the showrooms would be just the reverse of those of the Eastern philosopher who, on passing through the market, "thanked the gods there were so many things he could do without!" The Directors of the Company were to be complimented in every way.

Continuing, Alderman Morris observed that the South Metropolitan Gas Company had been supplying that area for over a hundred years, during which time they must have witnessed many changes. The growth and development of the Undertaking during that period must have been a source of considerable pleasure to the Directors as well as to the workpeople. He hoped this would be reflected in the increased prosperity of the Company and increased benefit to the Borough. Referring to the activities of the Company, the Mayor said that it supplied an area of 52 square miles through 1,600 miles of mains. It had nearly half a million consumers and used a million tons of coal per annum. It had 18,000 shareholders and paid wages amounting to 1¼ million pounds a year. After reference to the valuable by-products obtained from the carbonization of coal, the Mayor went on to congratulate the Company on its co-partnership scheme, which, he said, was the ideal way of conducting any industry, securing as it did the intelligent interest and practical co-operation of every member of the staff. If the same system were introduced into every business they would have fewer labour troubles to-day. In conclusion, the Mayor thanked the Company very sincerely for its generous hospitality and assured those present of his pleasure at being asked to open the new showrooms and take part in that gathering.

The thanks of the guests were expressed to the Company by Lieut.-Col. DOLAND, M.P., who remarked upon the great consideration shown by all the gas undertakings with which he had come into contact. Public utility undertakings such as this had conducted their business in the interests of the community for more years than he cared to recall, and the present Chairman and his predecessors had always done their utmost to give the public what they wanted at a reasonable price. They offered the Company their heartfelt thanks for the opportunity of seeing the new showrooms, which, he hoped, would be the fore-runner of many others. He asked the guests to drink to the health and prosperity of the South Metropolitan Gas Company.

In acknowledgment, Mr. JONES briefly thanked them for the Toast, and observed that, contrary to belief in some quarters, gas undertakings like theirs had a soul, a heart, and a conscience. On the day they ceased to have these attributes they would go out of business.

The construction of the new premises was carried out by Messrs. Charles Barrett, Ltd., of Camberwell.

A Busy Year for West's Gas Improvement Company, Ltd.

Progress in 1937

Activity in the design, manufacture, and erection of carbonizing units, retort-house equipment, and fuel-handling plants for home and overseas gas undertakings has been well maintained in the West organization during the past year. As to the future, orders and enquiries now receiving attention provide grounds for anticipating another busy and productive period in the Company's long career.

The installations of Glover-West continuous vertical retorts which have reached the gas-making stage during the year include the extension of the plant at Carlisle in the form of a bench of the new large-unit retorts; the complete reconstruction of one of the original benches at Belfast with the new large retorts; one of the benches in the No. 2 retort house at the Elswick Works, Newcastle-upon-Tyne, in which the original 33 in. retorts have been replaced by the new model 40 in. retorts with up-to-date waste-heat recovery plant; a complete rebuilding of the retort bench at Warsaw after a period of most successful working; extensions in the form of additional retort settings to the existing Glover-West installations at Dudley, Worcester, Denny (Stirling), Dumbarton, Romford, Yeadon, and Ballymena (N. Ireland), and the new installations at Chard and Galashiels; the reconstruction on the steaming model of the further three settings at the Hollinwood Gas-Works of the Oldham Corporation; and a reconstruction of one of the settings at Rothesay.

A contract with the Alliance and Dublin Consumers' Gas Company for the construction of a complete carbonizing plant of an approximate daily capacity of 5 million cu.ft. was secured late in 1936, but the commencement of the work was delayed for several reasons until the autumn of last year. This plant comprises 64 50 in. Glover-West vertical retorts and is to be equipped with coal and coke handling plant and waste-heat boilers, all of the most up-to-date design. In the meantime a contract was secured with the same Company for an extensive coal-handling and storing plant with two lines of the West lip-bucket conveyors and band conveyors.

A contract for a complete Glover-West vertical retort installation with coal-handling plant has been received from the Clay Cross Gas Company, Ltd., Chesterfield. An order for a plant of similar design from the Largs Corporation Gas Department, Scotland, includes coal and coke handling plant, waste-heat recovery equipment, and pressure producers, and the important question of external appearance at this well-known seaside resort has led to an interesting mediæval treatment of the retort-house architecture. A contract for an installation of Glover-West vertical retorts at the Franceville Gas-Works at Tunis, North Africa, has been secured by Compagnie Gle. de Construction de Fours. For Sydenham, the South Suburban Gas Company has ordered an installation of Westvertical carbonizing chambers with complete coal and coke handling equipment and a waste-heat boiler.

Extensions to Glover-West vertical retort installations are on order by Leeds Corporation Gas Department (the extension in this instance to be built in line with the second Glover-West vertical retort plant at the Department's Meadow Lane Works); Bedford District Gas Company; Coatbridge Gas Company; Johnstone Corporation Gas Department; Leamington Priors Gas Company; Motherwell and Wishaw Corporation Gas Department; and Slough Gas and Coke Company.

Also included in the current programme of work is the rebuilding on the modern design of the Glover-West vertical retort installation at the Municipal Gas-Works of Bergen, Norway—a plant with a long record of good service.

The year's work includes a very large installation of plant for coal handling from barge to coal store at the Belfast Corporation Gas-Works, now nearing completion, while the extensive coke-handling plant at the East Greenwich works of the South Metropolitan Gas Company was started up in September. Another interesting coal plant contract is that with the Macclesfield Corporation Gas-Works; coal is to be unloaded from wagons in the railway sidings and transported in a West lip-bucket conveyor across a public highway to the existing conveyor above the coal bunkers on the Glover-West retort house. Other contracts for coal and coke handling plants of large or small extent, and orders for miscellaneous retort-house equipment, have reached the Company from widely distant sources.

Important work in further advancing the design of the Company's specialities has been accomplished during 1937 by its technical staff. The standard chain of the West automatically-lubricated lip-bucket conveyor—already enjoying a world-wide reputation as a very highly developed system of coal and coke transportation—has undergone modifications calculated to reduce still further the costs of maintenance and renewals. The success of several retort-house dust-extraction units now in regular operation has been followed up by further work towards perfecting the design of this useful equipment. The pressure equipment of producers, in which very many undertakings have found the solution of a troublesome fuel problem, has also been slightly modified for increased efficiency.

The year's operations in the research laboratory and gas plant at Manchester have been along the usual lines. The possibilities of new contributions to carbonizing practice have been under investigation in full-scale working conditions, and in addition there has been some interesting work on special problems for the gas and fuel industries.

Town Gas for Heating and Ventilation

From a Paper read before a meeting of the Manchester Branch of the Institution of Heating and Ventilating Engineers on Jan. 6.

by
F. DICKINSON,
Industrial Gas Engineer, United Kingdom Gas Corporation, Ltd.

Working costs constitute one of the most interesting and problematical issues of space heating. The matter is bound up with so many variable factors that it is very difficult to forecast accurate conclusions for any one particular heating season. Any calculation or formula must of necessity be based on experience, and even so it demands certain tolerances. As, however, a prospective client invariably requests an indication of the seasonal costs, some reasonable attempt must be made to meet this, and a calculation can be made on the basis of certain pre-determined assumptions on the following lines:

(1) The heating surface in each room is capable of maintaining the desired temperature when the external temperature is 30° F.
(2) The room thermostat is accurate, and is maintained at the correct setting.
(3) The pre-determined hours of operation are adhered to.
(4) Excessive ventilation is avoided.
(5) The calculation refers to a comparatively normal season, and is exclusive of heat required for the initial drying of the building.
(6) The boiler is operating at its practicable maximum efficiency.

Each of the above items is important and has a definite bearing on the possible variation in practice from the theoretical calculations. Before outlining a typical case it is necessary to show some of the variables which have been found in practice, so that you will realize how these can materially affect estimated costs which have been put forward in good faith, and on reasonable grounds. These are as follows:

(1) *Initial Drying of Buildings.*—This cost is carefully excluded from your own tenders, and is mostly excluded from normal calculations. It is necessary, it cannot be avoided, and it must therefore be treated as an extra cost item for the first heating season. Dependent on the size of building and other circumstances it can vary between 30% and 50% above the normal seasonal costs.

(2) *Normal Season.*—The wide range of external temperature variation throughout any one season or between comparative seasons makes evaluation of an average minimum temperature rather difficult, but a figure of 37° F. is not far wide of the mark. The response of a hot water system to outside temperature variation should have a straight line reflection on fuel costs, but this does not apply in practice owing to the definite time lag in attaining full emission from the heating elements, which means that extra fuel is consumed during this period. Some individuals base their calculations on an average minimum temperature of 30° F. to cover this, and others have been known to take 42° F. The figure of 37° F. appears to strike a fair average between these extremes, and incidentally is confirmed by records taken over a 3-year period.

(3) *Heating Surface Installed.*—This can vary between similar rooms in the same building, and between buildings of similar capacity and requirements. It is a matter of individual ideas, the internal temperature specified, and the amount of capital expenditure allowed. Many clients specify 60° F. where 63° to 65° F. is really required, and will only accept the lowest tender. This is bad practice, and liable to cause dissatisfaction after the system is in operation. The thermometer reading of 60° F. does not give a proper comfort effect for sedentary occupation. There is a minimum point where the contractor cannot maintain a fair marginal profit if the correct amount of heating surface is installed, and if the heating surface is inadequate for its work it necessitates operation of the boiler at maximum flow temperature for prolonged periods, in an endeavour to give the required total emission to the building. If the rooms are not balanced it will be found that the room thermostat is shutting down the boiler in correct relation to the temperature of the room in which it is installed, but other rooms are below this temperature.

(4) *Room Thermostats.*—These are usually accurate, but should be checked, as an occasional unit may not be so, and if this is not discovered in the first instance it can cause temporary inconvenience. It is essential that they should be used intelligently, as the ease of adjustment lends itself to abuse of a correctly balanced system if tampered with by unauthorized persons, and this is immediately reflected in the running costs. Simple locking arrangements are available, and these should be employed.

(5) *Hours of Operation.*—Once these have been arranged there is normally no occasion for them to be appreciably altered. Unfortunately in several instances this has been done without authority or material sensible reason, with resultant high running costs and dissatisfaction. I know of a case in point where a boiler was worked day and night at a flow temperature of 190° F., and used about 75,000 cu.ft. of gas per week. With similar weather conditions this boiler produced the same heating effect with a flow temperature of 160° F., a gas consumption of 45,000 cu.ft. per week, and working from 7 a.m. to 5 p.m. each day.

(6) *Excessive Ventilation.*—This is not a common trouble, but has been known to occur, particularly where there is no room thermostat. The additional number of air changes calls for extra heating, and this affects the costs.

(7) *Boiler Efficiency.*—A properly designed and installed gas boiler can give a steady working efficiency of about 80%. It is made to work at approximately full loading on demand, and the incidence of severe weather conditions affects only the period of demand operation. When the demand ceases, the boiler should shut completely down. If it is on light demand then the boiler should operate at full efficiency for a shorter period. There should be no intermediate stage, and this applies to the actual burner jets as well as the boiler itself. As a broad guide a boiler should be in operation for about 40 minutes in the hour on normal demand, with a reserve of 20 minutes for severe conditions, and on light demand its period of operation will vary between 15 and 30 minutes in the hour.

There are other points in respect of boiler efficiency which will be touched upon at a later stage.

On the assumption that an installation and its operation is normal a typical example of estimated costs can be given for, say, office heating, as follows:

DATA.

1.	Heat losses, 30°–65° F.	400,000 B.Th.U. per hour.
2.	Hours of occupation, per full day	9.0 a.m.— 5.30 p.m.
	,, ,, ,, , for Saturday	9.0 a.m.—12.30 p.m.
3.	Hours of boiler operation, per full day	7.0 a.m.— 5.30 p.m.
	,, ,, ,, ,, , for Saturday	7.0 a.m.—12.30 p.m.
4.	Boiler off at nights and week-ends.	
5.	Heating season	30 weeks.

ESTIMATED WORKING COSTS ON GAS.

Heat input per hour, 30°–65° F.	400,000 B.Th.U. per hour
,, ,, ,, 37°–65° F.	320,000 ,, ,,
Allow 80% boiler efficiency	400,000 ,, ,,
Therms per hour	4·0

DAILY CONSUMPTION.

2·0 hours × 100% load factor × 4·0 therms	= 8·0
8·5 ,, × 60% ,, ,, × 4·0 ,,	= 20·4
	28·4

SATURDAY.

2·0 hours × 100% load factor × 4·0 therms	= 8·0
3·5 ,, × 60% ,, ,, × 4·0 ,,	= 8·4
	16·4

Weekly consumption—(28·4 × 5) + 16·4	= 158·4 therms
Seasonal consumption, main burners, 158·4 × 30	= 4,752·0 ,,
,, ,, , pilot burners	= 252·0 ,,
Total seasonal consumption	= 5,004·0 ,,
Cost, at 5d. per therm	= £104 5 0
Labour cost, inspection, &c.—one man for one hour per week at 1s. per hour	= £1 10 0
Total seasonal cost	= £105 15 0
Average weekly cost	= £3 10 6

ESTIMATED WORKING COSTS ON COKE.

Heat input per hour, 37°–65° F. .. .. 320,000 B.Th.U. per hour
Pounds of coke per hour, at about 60% efficiency 45·7

DAILY CONSUMPTION—WEEKDAYS.

10 hours × 60% load factor × 45·7 = 274·20
14 „ × 60% „ × 45·7 = 255·92

530·12 × 5 days = 2,650·60 lb.

SATURDAY.

5·5 hours × 60% load factor × 45·7 = 150·81
18·5 „ × 40% „ × 45·7 = 338·18

488·99 = 488·99 lb.

SUNDAY.

24 hours × 40% load factor × 45·7 = 438·72 = 438·72 lb.
Total weekly consumption = 3,578·31 lb.
Total seasonal consumption = 107,349·3 lb.
„ „ „ = 47·9 tons, say = 48 tons
Cost, at 35s. per ton .. .. = £84 0 0
Labour, one man one hour per day at 1s. per hour .. = £10 10 0
Total cost per season .. .. = £94 10 0
Average cost per week .. .. = £3 3 0

The load factor is that portion of each hour during which it is estimated that the boiler is on demand against the heat input requirement. Owing to the daily and hourly variance of this requirement it is hardly possible accurately to estimate on this basis, and all figures have been averaged down to an hourly basis for multiplication to a seasonal result. The weekly cost must therefore be treated entirely as being an average, and comparisons to be equitable should be taken over a whole season. The only reason for showing an average weekly cost is that many people are more accustomed to comparison on this basis.

You will observe that there is a weekly differential in costs of 7·6d. in favour of coke, and a margin of this order is considered to be well covered by the convenience factor, and the consistency of heating. It might well be stated that coke prices will not always be as high as indicated. This is true, but on the other hand there are districts where gas would be supplied at a lower rate than 5d. per therm. This really reverts to the previous statement that a gross thermal comparison is not a true one. Perhaps the final answer is that users are satisfied that the overall advantages outweigh the slight disparity in running costs.

There is another aspect of this question which has not to my knowledge been considered—*i.e.*, the continuous operation of a gas boiler for heating.

Superficially this would appear to be an expensive proposition, but let us examine the suggestion. Instead of installing a boiler rated at 450,000 B.Th.U. per hour, have one at 150,000 B.Th.U. capacity, or even less. This would mean that the initial heating period would be extended, but there is nothing against that, and it is better to warm up the system slowly than to force heat through at a fast rate when everything is cold. Within a day or two the brickwork would reach saturation point at the agreed room temperatures, and it is then only necessary to maintain these temperatures.

If this is done there is only the variation in outside temperature to cope with at night time. The residual heat in the body of the building will be practically static; there is a loss through glass surfaces, but there are fewer air changes during this period, and the greatest heat input is usually to balance the air changes. A reduction in air changes from three per hour to one per hour will offset a considerable amount of outside temperature drop, and I am of the opinion that it is a feasible proposition. The load factor would probably be about 50% overnight on this low rated boiler, the room thermostat would control as in the daytime, and the overall costs would probably be lower than for a larger boiler which is run in the daytime only, and has to offset the night losses during the first two hours of daily operation. Another angle on this is that buildings which have no central heating installation, but use local heating during the day period only, are rarely below 50° F. in the morning even when the outside temperature falls below 30° F., so that the maintenance required is not so great as might be imagined.

The domestic hot water demand is fairly constant throughout the year, and varies from 30 gallons per day average for medium houses to 1,500 or more gallons per day for hospitals. The estimation of the precise daily usage is not easy, as there is rarely a water meter on this supply, and residents have only a vague idea of the quantity required or used. This lack of definition is not always confined to laymen. I recently was asked to give guaranteed costs for a boiler which supplied the central heating and hot water demand. The boiler rating was 250,000 B.Th.U. per hour, and the hot water rating given as 50,000 B.Th.U. per hour. This was for a casual supply to five wash basins, and a certain amount of water for daily cleaning in a set of offices. I could not visualize more than 50 gallons usage per working day, and tried hard to have a small independent boiler installed for this work, but without avail. The large boiler only would do, and this must be run for some 22 weeks in the year solely for hot water requirements with a maximum demand of about 20,000 B.Th.U., and an average demand of about 5,000 B.Th.U. per hour.

It was obviously an uneconomic and inefficient proposition with a relatively high running cost, and I was criticized for being unable to reproduce the lower costs of a small and efficient unit. Moreover, the capital costs were approximately the same, as the heating boiler would have been smaller, and a direct type of hot water boiler would have been used in conjunction with a simple storage cylinder instead of an indirect cylinder; also, both boilers would have been fully efficient when on demand.

It would be interesting to have your views on the feasibility of maintaining the storage of hot water at higher temperatures than is customary, on the assumption of having a well-lagged cylinder, with lagged pipes and reasonably short runs. In practice, if the water is only about 100°-105° F. the tap is left full on all the time, and about double the usual quantity of water is used, without the addition of any cold water. If the hot water is at about 180° F. the minimum amount is used, and plenty of cold water added. This is the psychological reaction of a normal person. In the first case heat which has been expended to raise the water 55° F. is extravagantly wasted, and in the second case the heat expended to raise the water 130° F. is economically used. It would appear that unless the differential heat losses through the lagging are disproportionate at the two temperatures there is a probable saving in fuel of about 15% to 20%.

Layout of a Low-Pressure Hot Water System.

Assuming that the heat losses have been calculated on a 30°-60° F. basis, then the heating surface installed should be capable of 30°-65° F. loading, or alternatively should be such that the building will reach 60° F. in two hours from lighting the boiler. The additional initial expenditure is justified not only in the satisfactory heating obtained, but in the running costs, as it is possible to run at a lower flow temperature for shorter periods, with a resultant reduction in fuel costs.

I have recently obtained actual costs of an installation designed and run on this basis. Over nine weeks ended Nov. 30, 1937, the average weekly costs were 10s. 1½d. against the average weekly cost given for the whole season of £1 3s. 4d. The plant has given excellent heating from its inception, the thermostatic controls and clock switch have operated with precision, and the clients are well satisfied with both the installation and the costs, for, while realizing that several months of relatively cold weather are to follow, they are of the opinion that the total seasonal costs will not be far removed from the estimated costs. In another case the average estimated weekly costs were 8s. 6d., and during the recent severe weather the actual costs were 8s. 9d. per week. If the radiators are full open the room thermostat will operate earlier, and if they are all closed the water thermostat will shut down the boiler. With inadequate heating surface the operating conditions are reversed, and the boiler is punished in an endeavour to get the maximum emissivity from the existing surface. It is a physical and mechanical impossibility for adequate emission to be obtained by this method, and the incidence of a flow temperature of 190° F. with a considerable extension of the normal hours of boiler operation has little mechanical effect but produces excessive fuel consumption. In point of fact there would be very little benefit if a second boiler was connected to the circuit, as the fault is elementary, and must be corrected at its source. Wherever the size of installation will allow there should be a pump in circuit, if only for the initial circulation each day.

The connection of the boiler to the water circuit is straightforward, and arrangements can be made for the thermometer and safety valve to be fitted in the flow connections, if they are not on the boiler, where they ought to be. The boiler flue-piece ends at a cowl, and flue piping must be carried from this point outside the building in such a manner that down-draughts are eliminated. The flue must rise above the eaves or any adjacent building, and finish with a suitable terminal fitting. A catch pot and drain cock should be fitted at the lowest appropriate point to enable any condensate to be withdrawn, where necessary. The hydrogen content of town gas is such that if the flue gas temperature is allowed to fall below a certain point there will be a precipitation of moisture on the walls of a cold flue. This will in due course accumulate in the catch pot, and requires occasional draining. If a high flue temperature is maintained the moisture is carried clear of the flue, but the boiler efficiency is reduced, so that a reasonable compromise is to have a flue temperature of about 260° F.

The original flue pipes were of cast iron, but these were found to be unsatisfactory, and the present practice is to use glazed drain pipe or asbestos composition pipes. A recent innovation is steel or cast iron pipe with a vitreous enamel surface, and this should be quite satisfactory, but has not been tested in actual practice for a long enough period to enable one to state categorically that it is as satisfactory as glazed drain pipe.

Where a new brick chimney is being built it can be of normal proportions, and should be lined with glazed tiles, pointed with a bituminous or similar compound. There is no necessity, beyond avoiding down-draughts, for such a chimney to be high, as it is only used for carrying the gases away from the boiler house, and draught intensity is not required for combustion purposes as with solid fuel. A clear opening equal to the flue area should be left at the base of the chimney and the flue pipe from the boiler should be carried into the centre of the chimney and pointed upwards. By this means there is always a draught of air through the chimney. When the hot flue gases leave the end of the flue pipe they are surrounded by this air current, and accelerate the flow by virtue of density difference so that the diluted gases are swept straight out to atmosphere with little likelihood of moisture precipitation. It is important that the chimney area should be clear throughout, and there should be no obstruction such as a chimney pot of small area.

With this arrangement there is no chance of down-draught reaching the boiler as it is neutralized by the hole in the chimney base, the natural airflow through the chimney, and the diverter which is fitted to the boiler itself. Also, variation of chimney draught due to barometric conditions can have no effect on the boiler operation.

These remarks apply to existing chimneys where such have to be used. It is preferable, however, to have independent flues if at all possible.

Another very important point is the proper ventilation of boiler houses. It must be realized that apart from normal ventilation there is a very definite requirement of air for combustion purposes. If, for example, the gas consumption is 1,000 cu.ft. per hour then about 4,500 cu.ft. of air per hour is essential, and must be allowed; otherwise there is an immediate reduction in flame efficiency. It is far better to allow over than under ventilation, and this can easily be arranged by having a wide mesh grille or louvre air inlet of ample capacity. The usual cast-iron grating is not satisfactory, as the holes are small and liable to become clogged in time, due to the accumulation of dirt and rust.

Gas Connections.

Returning to the boiler, there is now the question of gas connections. The size of service pipe is fixed by the burner connections, and it is always better to err on the generous side with service pipes. The boiler equipment usually comprises the burners, taps, control valve, and shut-off cock, with the intermediate connections. It is advisable to have a governor between the control valve and the shut-off cock, to ensure steady gas flow conditions. If a full-way clock control is used, this should be fitted between the governor and the shut-off cock, and not 20 ft. away, as in a recent instance. Thus all the controls are arranged near to the boiler, and there is a clear service pipe from this point to the meter. In general industrial practice a back-pressure valve is fitted near to the outlet of the meter as a precautionary device. This is mainly because aerated mixture burners, and/or pressure air, are employed, where there is an odd chance of this working back into the gas main. Back-pressure valves are inexpensive, and their adoption can be recommended.

The usual maker's practice with burners on gas-fired boilers is to have the control valve adjusting-stop screwed up to allow about 5% of the maximum rating by-pass when the valve is in the closed position. It has been found that under average working conditions this is not sufficient, and the valve is adjusted to pass about 10% of the full rating.

If this were not done the flames would be so low and unstable that any down-draught would blow them out. Therefore, to be quite safe, this burner setting is adopted, and there is a comforting, but entirely fallacious, feeling that the additional heat helps to keep the boiler nice and warm.

In direct opposition to this practice it has been found more economical and safe to arrange for the burners to be shut right off when the boiler is not on demand, and to have several full-pressure pilot jets in constant operation for relighting purposes. The number of pilot jets is defined by the number of burner rails, but there should never be less than two jets, each having a consumption of about 4 cu.ft. per hour at normal mains pressure of about 3 in. w.g. The flames are strong and efficient, it is practically impossible to blow them off the jets, and any chance of failure through choking, &c., is reduced to a minimum. With the incorporation of the safety device, if the whole of the gas supply is shut off at any time and re-opened without the jets being ignited, there is no danger, as the minute quantity of gas leak from this source is well over-aerated, and in any case is swept straight through the boiler to the flue.

The question of low-flame warmth is answered by test results on a boiler which was operated only between 7 a.m.-5.30 p.m. each normal day, and 7 a.m.-12.30 p.m. on Saturday, being shut down every night and over the week-end. It was found that the water temperature each morning was approximately 60° F. in a boiler room of normal temperature, and as the cold water supply temperature was 50° F. it did not appear that the low-flame heat was of material assistance in maintaining the temperature of the water. The incidence of replacing the low-flame arrangement by two full-pressure small-capacity pilot jets had no effect whatsoever on the water temperature as observed prior to the clock control opening the boiler each morning.

The inference is that in the first case the low flames have a poor aeration effect and combustion is inefficient; secondly, any heat derived from this source is diluted and cooled by the comparatively large amount of air which is being passed through the boiler; thirdly, each narrow boiler combustion space acts as a chimney owing to the heat from the water, and this automatically creates a constant flow of cold air through the boiler which ultimately cools the water until equilibrium is established. Finally, the weekly gas consumption was reduced by 20%, and the client was well satisfied that he was not paying for some 1,700 cu.ft. of gas per day which was producing no effective heat.

In another case on a battery of three large boilers a consumption of 45,000 cu.ft. per week, in the non-operative periods only, was reduced to 5,000 cu.ft.

Where special machinery, &c., has to be protected from frost or very low temperatures it is possible to arrange two room thermostats in such a manner that the day thermostat will control the appropriate temperature of 65°-70° F., and the clock control will switch over to the other thermostat which will ensure the maintenance of a temperature of 40°-50° F. during the night and week-end periods.

On certain large sizes of boiler the gas burners are divided into two groups, each of which is fed by a separate service pipe, and has a control valve operated by an independent water thermostat. As these immersion thermostats are both in the same boiler, and can be separately adjusted, the position can arise where one is set for 120° F. and the other for 180° F., with the result that one group of burners will be shut off when the other is on full demand. This can be obviated by operating one thermostat and connecting the leak pipes from the two control valves into a common pipe prior to connection to the thermostat.

This will make the two control valves, and thus both groups of burners, operate in unison.

The Load Value of Appliances - - - -

by

R. TENNYSON-d'EYNCOURT,

of the Tottenham and District Gas Company.

In this Paper, which was read before a meeting of the London and Southern District Junior Gas Association on Jan. 18 (Mr. R. N. LeFevre, the President, in the chair), the Author discussed this important subject from the aspect of its guide to sales policy.

The load value of appliances is a subject on which available figures vary widely, and therefore one need not perhaps be so afraid of introducing yet another set of variants. It is unfortunate, however, that the compilation of the necessary figures for this Paper should have come at a time when my Company has just recently installed a complete mechanical costing system, but is not yet in a position to utilize this machinery for the purpose of analyzing gas consumptions on a really large scale, and in the greatest possible detail, factors which everyone will agree are essential to the production of anything like reliable figures.

It is necessary, therefore, that I should explain the method adopted in the preparation of these statistics, as this must qualify the results obtained, and have a material bearing on the whole subject.

Owing to the difficulty of grouping sufficiently large numbers of consumers who had only had one or even two specific types of appliances installed without other change for the period of twelve months, it was decided to arrive at the various load values by subtraction—a system which has, I think, certain advantages, as I shall endeavour to prove later.

The period under review was only for twelve months, and not, as I should have liked it, for a number of years. Only consumers who retained similar appliances throughout the whole period were considered, no attempt being made to introduce a formula to cover the large numbers who had wisely installed additional apparatus. Only the main urban areas served by my Company were included, and in these there is no variation in the price charged for gas. Even so, considerable variations in the individual means of the consumers must occur, although they must be grouped together.

One can visualize one of those gigantic formulæ, with which many of us have had the pleasure of grappling, evolved to suit these many varying conditions and to include such factors as price charged for gas, income of family correlated with locality, occupation and social standing, size and type of house, size and age of family, and last, but not least, their habits, which at present only a Government inspector is entitled to enquire about.

Change of Circumstances.

There will always remain, however, one factor for which we cannot make provision—namely, change of circumstances. Our "Re-read meter" reports show that a large number of cases queried on account of apparent "over-consumption" are accounted for by the almost continuous use of a bedroom gas fire as a result of illness, which can easily produce 100% increased consumption over a corresponding quarter. In addition, of course, people may be better or worse off, have babies, or travel to our greater benefit or detriment.

Information on all these factors, except those of habits and circumstances, could be obtained by survey, and suitable headings evolved under which a complete cross-analysis of any number of combinations could be prepared mechanically. A careful study of these statistics would then yield a possible basis on which to pursue the investigation as a whole, and I should be very interested to hear of any work that has been carried out on these lines.

I therefore present these figures for average consumptions without apology, believing them to be as nearly true a guide to the relative load value of different types of appliance installed under normal working conditions as those already available, or as the estimated values which are frequently discussed to-day. Further to this I claim that by subtracting consumptions for groups utilizing a cooker as common factor with differing types of other appliances, the averaging process is more widely spread, and I do not think that anyone will altogether disagree with the figure which we have been able to establish for the cooking load.

The following, therefore, are the averages obtained for these differing groups both for ordinary and coin meter consumers, and then for both taken together; and although many of these values may appear to be low, the average annual consumption per domestic consumer on my Company's area of supply compares favourably with those published for other London Companies.

Average Annual Consumptions for Installations Comprising Varying Appliances.

	Appliances Installed.	Average Consumptions in Cu.Ft. per Annum.		
		Ordinary Consumers.	Coin Consumers.	Ordinary and Coin Consumers.
A.	Cookers only	18,800	17,100	17,600
B.	Cookers and portable fire	20,700	19,000	20,200
C.	Cooker and single-point	22,800	23,300	22,900
D.	Cooker and sink heater	23,100	21,900	22,600
E.	Cooker and copper	20,600	21,700	21,500
F.	Cooker, copper, and iron	26,000	21,700	22,300
G.	Cooker, copper, and coke grate	21,900	21,900	21,900
H.	Cooker, copper, and multi-point	26,700	30,000	28,100
I.	Cooker, copper, and fire	23,500	24,700	24,200

Now by subtracting A—cooker only—from B, C, D, and E, and E—cooker and copper—from F, G, H, and I, we obtain the following net values for the various appliances included in these groups:

Average Annual Increased Gas Consumptions Accruing from the Installation of:

	Cu.Ft.
Cooker	17,600
Portable fire	2,600
Single-point	5,300
Sink heater	5,000
Copper	3,900
Iron	800
Coke grate	400
Multi-point water heater	6,600
Fire	2,700

Of the above figures some interest attaches to the value obtained for the copper at 3,900 cu.ft. per annum in view of an option scheme introduced some eighteen months ago by my Company for coin meter consumers, who, receiving 1 cu.ft. per penny less where this appliance is installed, have half the total annual amount accruing thereby returned to them where increased gas consumption exceeds 3,000 cu.ft. per annum, and the whole where added consumption is 6,000 cu.ft. In this way the copper can conditionally be obtained free. Interest attaches to the sink heater for the high value obtained as compared with the multi-point; to the fires for the low value obtained for what must be considered normal use with our present English climate; and to the coke grate for the absurdly low figure of 400 cu.ft. per annum. In this connection I have naturally endeavoured to investigate the matter further, but circumstances have prevented me from obtaining any information which can justifiably account for this apparent anomaly. I am of the opinion, however, that two theories are tenable. On the one hand, quite a number of people are known to light their coke fires with paper and wood, the latter probably obtained from boxes left by the grocer, while on the other, since our records do not show anything but the maker's number—and this unfortunately does not differentiate between ordinary and back-boiler types—it is conceivable that where a back-boiler is installed the water heating load is not being obtained on the

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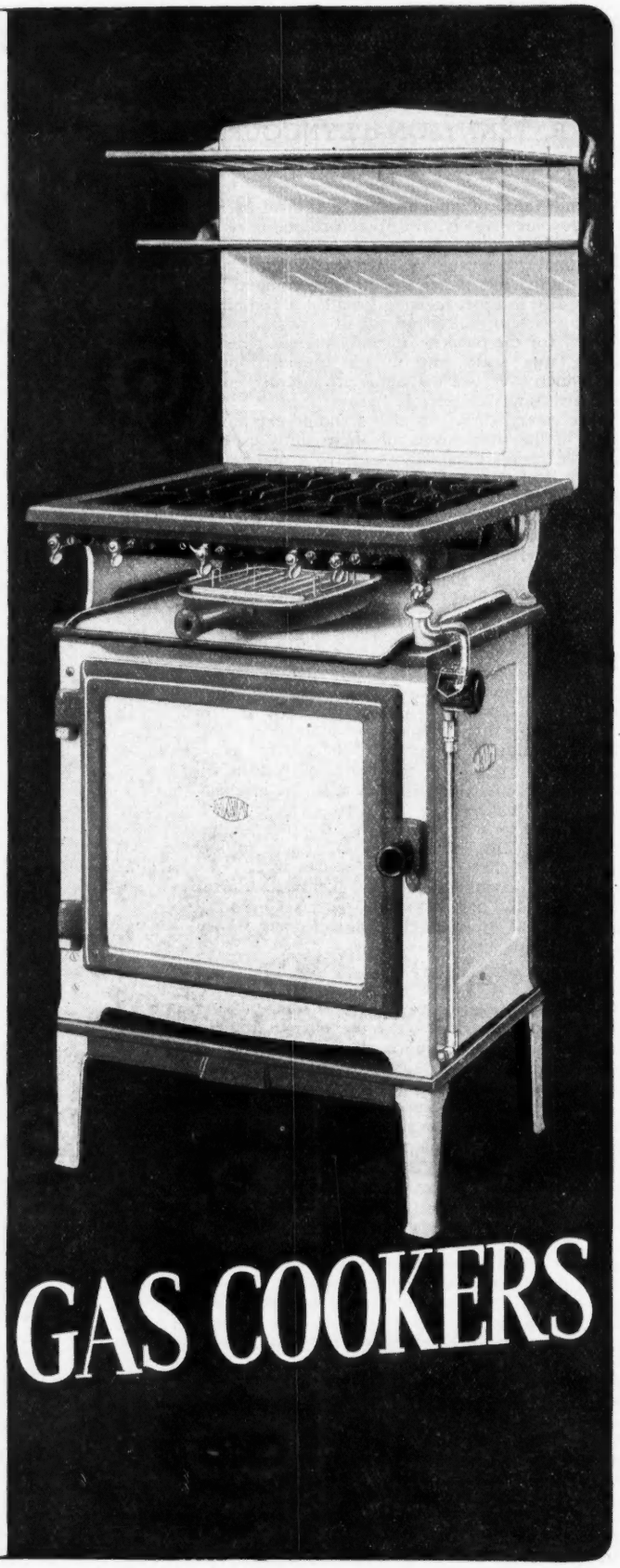

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cooker or copper, a fact which would further emphasize the necessity for considering net figures only.

Refrigeration and Storage Heaters.

As you will have observed, no mention has been made of either refrigerators or storage water heaters; but there has been an opportunity of considering these separately, even if only in small numbers.

For twenty-eight cases where L.22 refrigerators have been installed for a period of twelve months without other change either before or during this period, an average increase in consumption of almost exactly 10,000 cu.ft. per annum has been obtained. Three average cases and three "high" cases have been further investigated, and the consumers specially called upon, and it has been found that in each case our appliance records were correct, but that the "highs" had made increasing use of other appliances as well as keeping their refrigerators in constant operation, while two of the averages had made only intermittent use of the cabinet in winter time, but increased the use of gas fires. The third "average" case, however, proved to be the most interesting and conclusive of all, since annual consumption had increased from 6,300 cu.ft. to 16,500 cu.ft., while our records showed that only an L.22 refrigerator had been installed in an otherwise all-electric house. The previous consumption of 6,300 cu.ft. had, however, been obtained through the use of a gas ring, while the refrigerator had been used continuously and had therefore used 10,200 cu.ft. in the year.

For storage water heaters I am able to give the average consumptions obtained where a number of slow-recovery heaters installed under our all-in 6d. per day scheme were metered separately for the purpose of investigating the results obtained. The individual quarterly and annual consumptions recorded are so nearly the same in every case that it would be safe to assume that these could be taken as the average of all such installations. Here the average quarterly consumption is approximately 10,000 cu.ft. and the annual 40,000 cu.ft., or exactly the 200 therms which had been cited previously as a load value for this type of appliance. This figure, of course, does not take into account any water heating losses as with the values given for other appliances, but the figure is comparatively so high that any losses would probably pass without comment if the net figure was available.

No reliable figures are as yet available for modern circulator installations used in conjunction with coke boilers, but undoubtedly these will eventually prove that such installations have a high value of the order of 15,000 cu.ft. per annum. It is also to be regretted that none is available for fire-lighters, but I shall look forward to obtaining these, as well as further figures for the appliances already covered, as soon as our machines can be operated for this purpose.

As a matter of interest, I add some average annual consumptions taken out recently for varying installations in about 400 houses on new estates, for the most part situated in Edmonton, and also for another new estate comprising 300 houses. The chief observation one can make about these is that, in spite of widely differing types and numbers of appliances, the maximum difference in consumption is only 7,900 cu.ft. between 17,800 cu.ft. and 25,700 cu.ft., while seven out of nine fall between 20,000 and 25,700 cu.ft. per annum.

		Average Annual Consumption per Consumer, Cu.Ft.
A.	Cooker, copper, and multi-point water heater	20,600
	Cooker, copper, and coke fire	20,400
	Cooker, copper, and two fires	20,000
	Cooker and copper	17,800
	Cooker, copper, sink heater, and coke grate	22,800
	Cooker, copper, multi-point water heater, and two fires	25,100
	Cooker, copper, and lighting	19,100
B.	Cooker, copper, one fire, and multi-point water heater	25,700
	Cooker, copper, and multi-point water heater	23,600

Sales Policy.

While our commodity price is tied down both by law, competition, and economic circumstances, practically all appliances with the exception of the gas ring and the fire-lighter involve a capital expenditure far greater than the total gross receipts from the probable sale of gas in a year, while the gross profit accruing from the sale of the gas will not even in part cover the rental value of such appliance, which value it is fair to compute on a comparatively short life basis when dealing with most modern automatic appliances and modern finishes.

To illustrate this point, let us now consider some of the appliances for which I have already given net load values:

	£	s.	d.
1. COOKER—			
Cost, including fixing (say)	7	0	0
Cost spread over 5 years, per annum	1	12	0
Gas consumption per annum, 17,600 cu.ft.			
" " " " 88 therms			
Total revenue from sale of gas at 8·6d. per therm	3	3	0
Total profit at 1½d. per therm (say)	0	11	0
2. PORTABLE FIRE—			
Cost, including fixing (say)	1	5	0
Cost spread over 5 years	0	5	8
Gas consumption per annum, 2,600 cu.ft.			
" " " " 13 therms			
Total revenue from sale of gas at 8·6d. per therm	0	9	4
Total profit at 1½d. per therm	0	1	7½
3. SINK HEATER—			
Cost, including fixing (say)	5	10	0
Cost spread over 5 years, per annum	1	5	3
Gas consumption per annum, 5,000 cu.ft.			
" " " " 25 therms			
Total revenue from sale of gas at 8·6d. per therm	0	17	11
Total profit at 1½d. per therm	0	3	1½

To give further point to this argument, let us consider what increased price would have to be charged for gas if each of these appliances were given away and installed free while the margin of gross profit is maintained at the previously assumed level of 1½d. per therm:

1. COOKER—	
Balance required per annum	32/-
Number of therms consumed	88
Additional cost per therm	4·36d.
Gross cost per therm	12·96d.
2. PORTABLE FIRE—	
Balance required per annum	5/8
Number of therms consumed	13
Additional cost per therm	5·23d.
Gross cost per therm	13·83d.
3. SINK HEATER—	
Balance required per annum	25/3
Number of therms consumed	25
Additional cost per therm	12·12d.
Gross cost per therm	20·72d.

The proposition can therefore be said to have been taken *ad absurdum*, while it is always true that anything which is obtained for nothing is of no value to anybody.

This then brings us to the all-important question—should any of the costs incurred in selling or installing appliances be chargeable to gas, and, if so, to what extent? My own view and the policy adopted by my Company is that none should be; but this statement must, of course, be qualified by the proviso that where electrical competition demands it, any undertaking would be justified in hazarding a part of the potential profit from the sale of gas in order to obtain the business, or, rather, in order not to lose it.

Free Electric Sink Heaters.

I have in mind the case of one London undertaking whose area of supply is for the most part served electrically by an undertaking, who are now offering a free sink heater with every electric cooker installed—an offer which, in the ordinary way, it would be extremely difficult to combat, even by using our most powerful arguments of speed and cheaper running costs. If the sink heater business only was involved, I think that there would be no two sides to the question; but obviously the gas cooking load is the real objective of the attack and must therefore be protected and consolidated. To effect this the undertaking has made available a storage type sink heater at low rental, selecting this as having probably a longer life and lower maintenance requirements. It has been necessary, nevertheless, to subsidize the one appliance, in order to retain the load on another, so that we are justified in adding the potential profit from the sale of gas for the cooker to that for the sink heater—a load worth 22,600 cu.ft., producing an assumed gross profit of 14s. 1½d. per annum. Or, looking at it another way, the potential profit on sale of gas for the sink heater at 3s. 1½d. per annum can with justification be devoted to subsidizing the rental charge of the appliance, if its installation is instrumental in retaining the cooking load and therefore a potential profit of 11s.

I must add that of course the electrical offer is only made possible by their ability to charge a high price for shop lighting and power supply, and would not be feasible if they were

limited to supplying current to their domestic consumers at ½d. per unit *plus* standing charge.

Although the instance which I have cited may appear to call for a fourth motive for sales—namely, consolidation of existing consumers—I think that we can really treat this as a branch of publicity in that money has to be expended without direct return, but with a very definite objective in view—namely, the retention and therefore the ultimate expansion of our business.

Publicity for the most part takes the form of direct approach either through the newspaper, the post, or by personal representation, and its cost in each case, unless generalized advertising is undertaken for some special "prestige" object, should be recouped from profit on the sale of appliances. This also applies where goods are supplied on concessional terms, as in the case of the "two packets for the price of one," since the offer has predetermined limits, and can therefore be covered by subsequent sales.

In our own Industry we have offered a limited concession on refrigerators purchased during the winter months, and most undertakings are prepared to grant concessional terms to doctors, dentists, and others, on whose premises appliances are seen and often, during long waits, examined in detail.

Appliances for Educational Centres.

My Company has recently instituted a scheme for supplying modern domestic appliances free of charge to Education Authorities for all Domestic Science Centres, where such apparatus is used specifically for educational purposes. Under the terms of the agreement my Company reserves the right to exchange these appliances at any time they think desirable, and it is proposed that this should be done every twelve months, when the second-hand value of the appliances is still sufficient to recoup the original cost, thus ensuring that the rising generation are in contact with gas in its best and most up-to-date forms. At the same time, however, the scheme is practically self-supporting.

In my view, we can class under the heading "prestige," as applied to actual sales—and not to service, showrooms, or office buildings—all those small "gadgets" from which our rivals have an almost unlimited range to choose and which for the most part are marketed for them by traders of all kinds throughout the country.

"All you have to do is just plug it in" or "Just plug in to your mains" are familiar enough slogans or salespoints, and I am personally of the opinion that our Industry should see that plug-in points are everywhere provided so that we can in truth advise "Plug in to gas" with some hope that it will not be necessary first to run a supply. New properties have electric plug points already fitted, an invitation to follow the salesman's advice, while gas points are usually a rusty iron cap sticking up through the floor-boards to trip up the unwary or spoil the lay of the carpet.

These points should be made an invitation to "Plug in to gas," and every gas fire supply should in my opinion include a plug-in connector, or a combined gas-cock-cum-plug-in, a fitting I hope we shall see developed in the near future.

No one will deny that his own gas bill is always too large, however large or however small it may actually be; and I have observed a natural tendency among all men to suggest that economies should first be effected in respect of their fuel bills, however well they can afford them, rather than at the expense of their pleasures.

The English public to-day is not yet prepared to spend ungrudgingly on home comforts, and a spartan strain which deems all comfort a luxurious indulgence still persists. Apart from this, a very large section of the public has strictly limited means, although post-war wage levels have placed many in a far better position than the "black-coated brigade."

Mrs. Murphy, in a paper read a fortnight ago to the North London Salesman's Circle, gave these actual statistics for the homes of Great Britain:

"A"—Incomes of over £10 per week	600,000
"B"—Incomes between £4–£10 per week ..	2,500,000
"C"—Incomes below £4 per week	8,500,000

The majority of consumers on my Company's area of supply come under Group "C," and it is interesting to note that for 400 houses on new estates the total annual gas consumptions shown in the first part of this Paper fall within such narrow limits, in spite of the widely differing numbers and types of appliances installed.

It may with some truth be argued that these particular consumers are at present overloaded with the payment of house, furniture, and appliance purchase instalments; but on one estate I know of, where the builder has installed multi-point water heaters, it has been found that the majority of these are not used because consumers say they cannot afford to do so with gas charged at 13d. per therm. Although the cost of the appliance must of necessity be included in the price of the house, it does not appear as a direct charge in connection with gas, which supports my argument that the public always limit what they are prepared to spend on the actual fuel, and appear unwilling to increase this even in cases where they have completed hire purchase agreements. This points to the absolute necessity for keeping the basic commodity charge as low as possible by relieving it of all liabilities arising out of the appliance side of our business; but I cannot resist this opportunity, however, of deprecating the use of the word "cheap" as a sales point for gas, while gas has still an undisputed superiority in speed and flexibility.

Goods and the Commodity.

There are many who believe that the public is rapidly becoming tied up with an excessive amount of hire-purchase payments to the detriment of the sale of gas; but I am of the opinion that the majority divide their total liability between goods and the commodity, and consider each from a separate viewpoint, appliances being classed as equipment for the home, gas as a running cost. Nevertheless, the system adopted by my Company whereby hire-purchase instalments or rentals are collected by account and not at the time of clearing the coin meter has many advantages, not least of which is the furtherance of the idea that goods and gas are to be considered separately. I believe such a practice would prove advantageous with ordinary consumers except for their particular dislike of writing cheques.

While everybody will agree that the load value of appliances must be a guide to sales policy, they must at the same time admit the truth of the old adage "Many mickles make a muckle."

When deliberating ways and means of increasing consumption per consumer—one of the most vital and urgent problems of our Industry to-day—we are very apt to think and speak of individual types of appliances and attach to them a hypothetical load value which is seldom if ever realized in practice, and to disregard the net value which is likely to result from the installation of such an appliance when fixed in conjunction with a variety of others.

Further to this, and in our efforts to educate the public to a wider use of our commodity, we are apt to press forward with schemes covering appliances and installations, the operation of which best suit our book either on the manufacturing, distribution, or fitting side, and largely to ignore the present psychological outlook of the general public to the value of comfort in the home and their ability or willingness to meet the cost of it. From the supplier's point of view, the capital outlay should be considered in relation to the potential load value, as well as considering the cash outlay on the part of the consumer in relation to the service to be obtained. In this connection it would be interesting to evolve a formula and establish some relative index.

Circumstances must always alter cases, and competition has always to be faced and met, but our attention is too frequently diverted into one narrow channel down which we pursue a relentless course, absorbing our energies and our resources rather than conserving them for a mass attack on the problem in general.

This is particularly true in connection with the outside representative staff, who become imbued with such enthusiasm for promoting one aspect of our business that others, smaller perhaps but frequently of greater importance to our relationship with the consumer, are not given the attention which they merit.

Value of Personal Representation.

Personal representation will always remain the finest possible link between the supplier and the public, to whom a call signifies some real interest on the part of the supplier.

"Nobody has been near me for ages" is to the average person an indictment of the supplier, even where the person has not knowingly required any service, either maintenance or installation.

Representatives of our authorized dealers are doing good work to remedy this latter state of affairs, and while logical and practical training is recognized as playing an important part in the continued success of their operations, it is wise to bear in mind the limited practical ability not only of these men, but of many of the outside representatives of our undertakings. Appliances are designed or perfected in the laboratory in one set of circumstances, and from these or from limited district tests we are apt to adopt a policy without due regard to the ability of the representative to pursue it.

Discussion.

Among those who contributed to the discussion which followed were the undermentioned—namely, Mr. Offord Buxton (South Metropolitan Gas Company), Mr. C. A. Deas (Hertford), Mr. E. W. B. Dunning (Gas Light and Coke), Mr. F. Holland (North Middlesex), Mr. C. A. Masterman (Gas Light and Coke), Mr. T. G. Noble (Gas Light and Coke), Mr. R. J. Pepper (Gas Light and Coke), Mr. C. F. Petersen (Bournemouth), Mr. P. Richbell (Croydon), Mr. F. C. Smith (Gas Light and Coke), and Mr. T. A. Woolf (Tottenham).

Having congratulated the Author on his Paper, the PRESIDENT opened the meeting for discussion, and in the course of various observations on the subject it was remarked that doubt existed as to whether the title of the Paper was intended to mean load value as a definite guide to sales policy or as *one* guide. No mention appeared of the load value of appliances as it affected mains and services or, to go one step further, the works. Most of them were familiar with the daily cooking peak, either from the mains or works point of view; works people, also, knew what a cold day could do to their output. Mr. d'Eyncourt was asked for his views on whether an appliance should be sold entirely from the point of view of its own load value and mains and works adapted to suit. This point was raised because, as no doubt Mr. d'Eyncourt was aware, peak load gas could be, and often was, very expensive. It was pointed out that the Author apparently did not consider lighting appliances as of load value since he did not specifically mention it. From the table given it was estimated that the annual lighting load for a consumer with an all-gas house was 1,300 cu.ft. It was suggested that the figure was probably nearer 13,000 cu.ft. per annum and it could not be imagined at less than 10,000 cu.ft. Mr. d'Eyncourt was asked for his views on this point.

Mr. MASTERMAN took the Author to task for "progressing backwards" by expressing himself in cubic feet instead of therms—which was regarded as a retrograde step. The tables in the Paper were looked upon with suspicion because they showed a quite irrational relation between slot and ordinary consumers' consumptions with various types of appliances. It was suggested that the figures given for the annual consumptions of various types of water heater were misleading, it being contended that if the same amount of hot water was used the consumption of the heaters should be tolerably close, regardless of the type of heater—instantaneous, circulator, or storage—whereas the Author's figures showed wide variations in the annual consumptions of the different classes of appliance. How could the "average" consumption of a gas fire be assumed? It might be fitted in the spare bedroom or it might be in the living-room consumption per annum varying from nothing to over 200 therms—so it was not considered that this average meant anything. It was pointed out that at Kensal House, where it was possible to check up the daily consumption, the average for cooking and water heating was about 200 therms per annum—which was very much higher than the figures given by Mr. d'Eyncourt. The use of gas for the living-room fire, moreover, would almost double the load.

Service to the Community.

As regards the Author's observations on the subject of "profit, publicity, and prestige," it was stated that the Gas Industry as a Public Utility was not primarily concerned with profit, the amount of which was strictly controlled, but was working on the basis of a clean atmosphere and service to the community. With regard to the assertion that "gas bills were always too large," it was contended that if the Industry gave good service people would not grouse at the gas bills—and if the cost of gas were no greater than the cost of using other fuels the consumer would be grateful. If gas were available at 6d. a therm for water heating and 4d. a therm for space heating one would be obtaining a clean automatic service at virtually no greater cost than was being expended on other fuels. In using gas, however, it was not merely the price of gas that had to be considered, but the price of gas *plus* the price of the appliance. There was a limit to the extent to which the price of the appliance could be put on to the price of gas;

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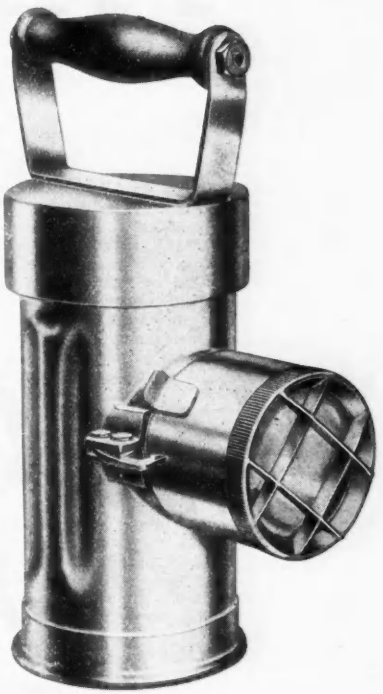

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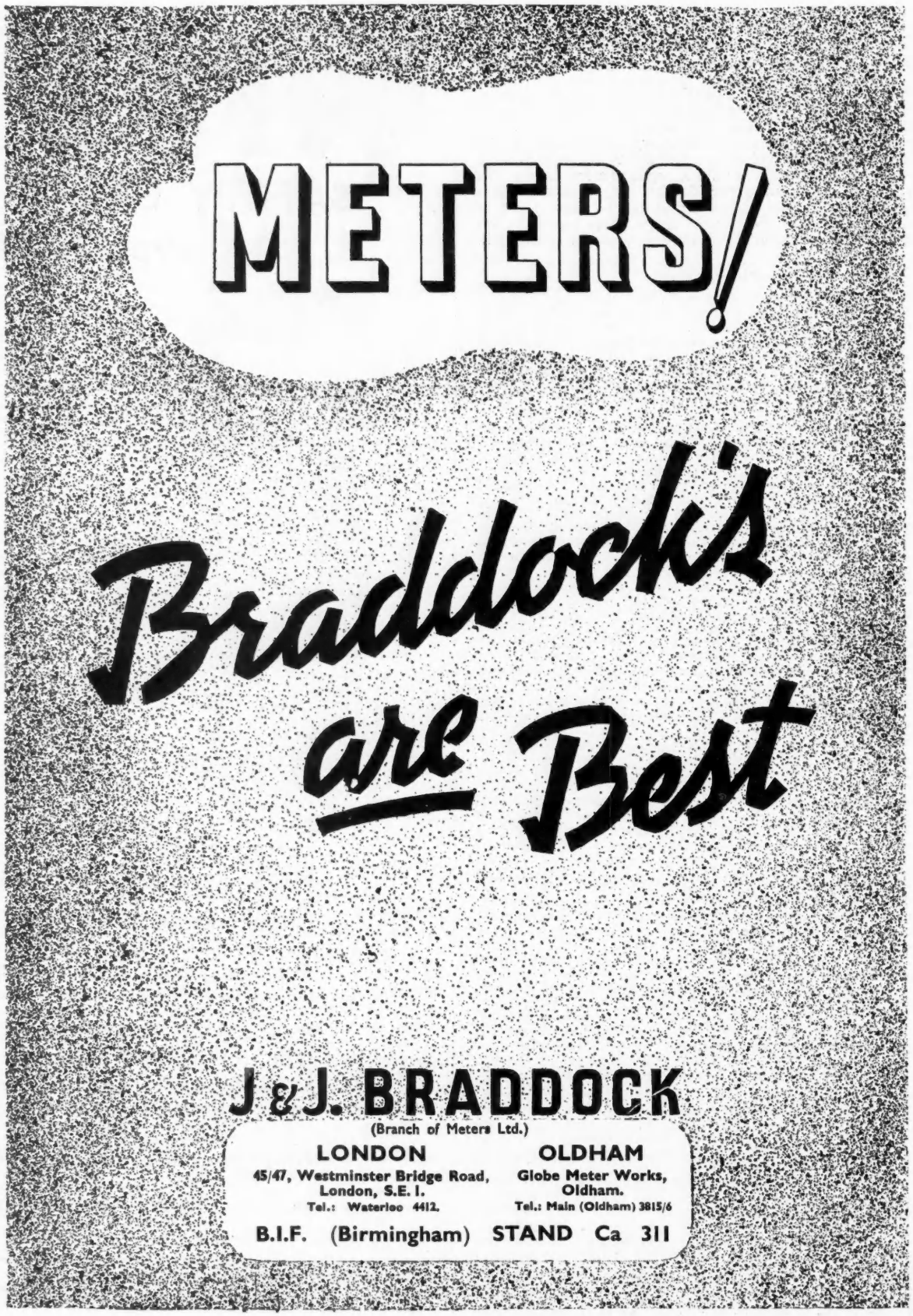
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otherwise one was penalizing the good consumer. There was a real danger of over-concentrating on the appliance while giving little thought to the use of gas. People who bought right up to the last penny on hire-purchase contracts had no money left to pay for the gas to burn in the appliances. It would be better to install only one or two appliances and enable the consumer to get the best service from them.

Disappointment was expressed at seeing no reference to the value of the lighting load in Mr. d'Eyncourt's Paper. The application of the subtraction method produced a consumption for this load of 1,300 cu.ft. per annum. Placed in its proper position in the first table, this figure assumed a far from negligible importance. Gas light was good light, and the lighting load was a good and constant one. Tacitly to ignore its existence was deplorable.

Mr. NOBLE said it was surprising that the Gas Industry, which was one of the most important in the country, appeared to have so few statistics on the very vital point of appliance load values. One would have thought that definite load values would have been established for appliances on the lines adopted in the United States of America. The Author was asked how many homes he took into account in preparing his average figures; this was important because an average based on too few observations might be very misleading.

Value of Water Heating Load.

Particular concern was expressed at the low value Mr. d'Eyncourt attributed to water heating, this being regarded generally as of the greatest value. The Author had suggested that the multi-point heater, for example, consumed an average of only 33 therms per annum. Assuming an efficiency of 80%—which was a maximum figure for this type of heater—and a household of, say, four persons, this meant using about 8 gallons of hot water a day. Taking an efficiency of 60%, the load value of 33 therms per annum was equivalent to only 6 gallons a day—which did not indicate a great number of baths! Nor did it seem to justify an initial expenditure of, perhaps, £20 on the appliance. It was suggested that quite an interesting figure would be obtained merely on the consumption of the pilot, for many people kept the pilot alight in order to avoid the trouble of lighting up the heater every time hot water was required. If the fairly high but not uncommon figure of 1 cu.ft. per hour were allowed for the pilot, if burning continuously this alone would account for some 44 therms per annum, which was more than the total load value given for the appliance on Mr. d'Eyncourt's area. If, on the other hand, the pilot were turned off at night—which was frequently done—and assuming that it was alight for, say, twelve hours a day, one would get 22 therms per annum apart from any hot water drawn off. Allowing for this, and assuming an efficiency of 80% again, the amount of water drawn off would appear to be about 5 gallons a day. While not disputing Mr. d'Eyncourt's figures, it was suggested that if they were accepted without reserve as the real load value of gas water heating they were getting a wrong impression of the value of the load to the Industry. If people who had these appliances installed could not afford to draw off more than three or four gallons of hot water a day then the appliances had been sold to the wrong type of consumer. They must distinguish between the present load value of the appliance and the potential load value. By right publicity and right technical effort they could persuade people to use more hot water; to obtain a consumption of 100 therms per annum, at a working efficiency of 60%, which was a fair figure to take, they had only to persuade people to use about 18 gallons a day—and this should not be difficult.

A further point made by Mr. d'Eyncourt was that the sink heater, with a load value of 25 therms per annum, was almost as good as that of the multi-point. It was true that if the sink heater was used to the normal *maximum* extent it approached the load value of any other hot water service used to a *minimum* extent. But while the sink heater could not have a consumption of much more than 25 therms per annum other systems were capable of giving a load value of 200 to 300 therms per annum. The figures, therefore, were no guide to the potential load.

As regards the use of the load value as a guide to sales policy, it was pointed out that the latter was governed by many factors. Mr. d'Eyncourt had mentioned prestige; but there were many others which were not capable of being accurately assessed at all. One could assess precisely the load value of an appliance; they knew the total cost to the consumer or to the undertaking. If one took the load value in therms per annum and divided it by the total annual cost to the consumer or undertaking, one obtained the only rational index of sales value over sales resistance.

Need for Separate Check Meters.

Another speaker suggested the most accurate method of obtaining the load values of apparatus was by means of a separate check meter in the homes of people whose habits were similar. Speakers agreed, in spite of what had been said to the contrary, that gas undertakings were in business primarily to make profit. They might have very exalted ideas on the subject of service; but so had everyone else who was in business. If they were not in business with the sole object of making profit their shareholders would say the sooner they went out of business the better. The only real criterion of the load value of sales was whether or not they were obtaining value for the money expended.

The Author's table showed that the load value of the single-point heater was 5,300 cu.ft. per annum, while that of the multi-point heater was 6,600—which looked very much as if they were wrong in pushing the multi-point heater instead of the single-point. Furthermore, were they doing the right thing in developing the instantaneous type of heater to the exclusion of the storage system? It was suggested that if half the money devoted to the development of the instantaneous heater had been spent on the storage type gas undertakings would have been able to make more profit out of the gas sold through the use of such heaters on the district. It was felt that there was room for a great deal more attention to the storage type of heater.

Another speaker stated that disappointing as Mr. d'Eyncourt's figures undoubtedly were they were similar to those which obtained on his own Company's area. Many of the water heater consumption figures had been taken out in conjunction with the cooker load, whose hotplate efficiency was of the order of only 30% as against the water heater efficiency of 60%. This made a considerable difference over the year. It was suggested that the Author's figures in regard to refrigerator consumption were somewhat low, as it had been found that an L.1 model consumed an average of 13,000 cu.ft. per annum. The Author was asked if the 6d. a day all-in charge included a margin of profit on the installation costs. This speaker also emphasized that they were definitely in business for profit. After all was said and done they had their shareholders to consider—and they did not put their money into philanthropic institutions. They must provide their service in consideration to themselves as well as their consumers.

It was enquired by another member whether any regard had been taken of alternative methods of water heating in the house. They must not overlook the transfer of the load from the cooker hotplate to the sink heater. Mr. d'Eyncourt had given them the actual consumptions, not the potential consumptions, which had a bearing on the criticism that appliances were being sold to consumers who could not afford to use them or who didn't want them. The figures showed that the average increased gas consumption accruing from the installation of a gas fire was 2,700 cu.ft. per annum, while that from a portable heater was 2,600 cu.ft. Yet many of them looked with a rather disparaging eye upon the latter appliance. There was a day, too, when they did not think the refrigerator load worth going out for because it seemed worth so little. Yet the figures showed an annual consumption of 10,000 cu.ft. No mention had been made of central heating which was a very useful load.

Money Available for Comforts.

In the average mind there was a definite idea as to how much could be spent on home comforts. Very few people had much money available for home comforts after they had purchased other things. The gas company was not the first consideration of the consumer; he had many things to consider before making himself comfortable at home. It was observed that the storage type of water heater was put into a rather different class of property from the multi-point. It must not be forgotten that pushing out unremunerative appliances at least prevented the adoption of electricity in many cases, while, in addition, the circumstances of the consumer would tend to improve with the result that the appliances would be used to a greater extent in the future. In America everyone regarded heating as a natural part of the household expenditure; but in England one rarely entered a house which was heated at all. They must attain this object by greater propaganda rather than by putting out appliances which consumers could not afford to run.

It was observed by Mr. F. C. SMITH that he would hate to be associated with an industry whose only desire was for profit, prestige, and publicity. It would be agreed that local enactments recognized that undertakings should make a profit; but they also recognized another condition—namely, that if it was desired to increase the profit (or dividend) the commodity must also be supplied at a lower rate. Surely their aims should be profit *plus* service. Mr. Herbert Morrison, it was recalled, had stated that the Gas Industry was an essential industry supplying an essential commodity on which the poorer classes relied.

Mr. Lacey's "Load Factor" graph was recalled, and it was stated that this was derived by taking the maximum hourly consumption and dividing it by the average consumption per hour. Apart from the increased capital costs required to meet peak demands in connection with the appliances, sales enthusiasts should think of the figures of the appliances they were putting out on the district from the viewpoint of average consumption rather than peak load consumption, because in meeting peak demands very considerable capital costs had to be met by the distribution

department, with its ultimate reflection on the price at which they were able to sell gas.

Reference was also made to the use of a separate slot for paying for hire-purchase of appliances, rather than combining the charge for appliances and gas. In regard to water heating, mention was made of the psychological effect on consumers of seeing the gas go up when the instantaneous heater was drawn upon. Thousands of people were using coke boilers for hot water supply, and many of them were using anthracite in them. It was therefore suggested that an effort should be made to replace such appliances with gas storage water heaters, for which the consumer would be prepared to pay 1s. or 1s. 6d. a week extra in order to do away with dust and the trouble involved in stoking, at the same time obtaining an automatic supply of hot water at a constant temperature. It was suggested that gas undertakings could well afford to subsidize the installation of thermal storage heaters in order to obtain this valuable load, which would obtain for all time.

[Pressure on our space unfortunately prevents the inclusion this week of Mr. Tennyson-d'Eyncourt's reply to the discussion, which will be published in our next issue.]

Tottenham and District Gas Company's Special Order

Proposed Acquisition of the Southgate Company

A proposal by the Tottenham and District Gas Company to absorb another contiguous undertaking, that of the Southgate and District Gas Company, on agreed terms, was the main feature of a Special Order, promoted under the Gas Undertakings Act, which was the subject of an enquiry opened by Mr. J. F. Ronca, O.B.E. (Director of Gas Administration), at the offices of the Board of Trade, Westminster, on Friday, Jan. 21. The area of the Southgate Company comprises parts of the Boroughs of Southgate and Finchley, and of the Urban Districts of Enfield, Friern Barnet, and East Barnet.

The Order also proposes to substitute a basic price of 11d. per therm and a basic dividend of 5% in the Tottenham Company for the existing standard price of 13·8d. per therm and a standard dividend of 3½%; and to make permissive, instead of compulsory, differential charges, authorized in 1935, relating to certain parts of the Tottenham Company's existing area.

Mr. Jacques Abady, K.C., and Mr. H. Royston Askew represented the Tottenham Company. The Southgate Company was represented by Mr. H. Murphy, K.C., and Mr. Clive Burt in a watching capacity. The only opponents remaining when the enquiry opened were the Finchley Borough Council and the Enfield U.D.C., represented respectively by Mr. H. F. Bidder and Mr. K. E. Lauder (Solicitor to the Enfield U.D.C.). They were concerned mainly with the proposed differential charge of 1d. per therm in the Southgate Company's area over the charge in the inner Tottenham area.

Mr. JACQUES ABADY, K.C., said that the Tottenham Company had promoted Orders from time to time and had amalgamated with various undertakings. In 1936 it had sold just under 22 million therms, and the selling price to ordinary consumers in the inner area was 8·6d. per therm. On that basis the authorized dividend was 6½%, which dividend had been paid for the past few years. Various differential charges had been authorized from time to time, applying to areas outside the central area of supply.

The area of supply of the Southgate Company was to the west of the original area of the Tottenham and Edmonton Gas Company, the boundaries being continguous for upwards of six miles. The Southgate Company operated on the maximum price basis, the authorized maximum price being 14·8d. per therm and the maximum dividend 7%. The selling price was 9·7d. per therm. The present Order sought to authorize the Tottenham Company to charge not more than 1d. per therm more in the present Southgate Company's area than in the inner Tottenham area, so that the immediate result of the Order would be a reduction of 0·1d. per therm in the price of gas to the consumers in the Southgate Company's area. That represented a saving of about £1,000 a year to the Southgate Company's consumers.

The scheme agreed upon between the companies as payment for the Southgate Undertaking was that for every £100 of 7% maximum dividend Southgate stock there should be created and issued £140 of 5% preference stock in the Tottenham Company; and for every £100 of Southgate 5% preference stock, £100 of Tottenham 5% preference stock. For every £100 of Southgate 4% debenture stock, a like amount of Tottenham 4% debenture stock; and for every £100 of Southgate 5% debenture stock, £125 of Tottenham 4% debenture stock.

Opposition Withdrawn.

A good deal of opposition from various local authorities had arisen when the Order was deposited. It was urged that the Board of Trade should be satisfied that no increase of dividend should result from the change to the basic price system of charging and that the proposed basic price of 11d. was justified, that the proposed power to charge more in Southgate than in Tottenham should be optional and not compulsory, and that the differential charge should be subject to revision in the future. There were other objections relating to various funds, &c. Amendments had been made to the Order to meet objections raised, with the result that the County Councils of Middlesex, Hertfordshire, Bedfordshire, and Essex, the Borough of Southgate and the Urban District Councils of Friern Barnet and East Barnet had withdrawn their opposition. The Tottenham Borough Council had been informed of the settlement made with the Middlesex County Council, and did not propose to be represented officially at the enquiry. The only opponents present there were the Finchley Borough Council and the Enfield Urban District Council, and they were concerned mainly with the proposal to charge more for gas in the Southgate Company's area than in Tottenham.

Dealing with the clauses in the Draft Order, Counsel said that the date stated for the transfer of the Southgate Undertaking to the Tottenham Company was Jan. 1, 1938. If, however, the Board were unable to antedate it when the Order was actually made, it was asked that the date of transfer should be altered to July 1, 1938, for convenience of accounting.

There were provisions in the Order for the retirement and compensation of the Southgate Company Directors, and relating to compensation of Southgate workmen who might not be willing to enter the service of the Tottenham Company.

It was pointed out by Counsel that co-partnership schemes were in operation in both the Tottenham and Southgate companies. It was proposed to keep the Southgate Company's co-partnership fund alive but not to pay any further profits into it, and the Southgate men would become entitled to participate in the Tottenham co-partnership scheme, which would apply to them in the same way as to the men in the Tottenham works.

Mr. RONCA asked whether the whole of that scheme had been explained to the men.

Mr. ABADY replied that it had. He added that it was proposed to keep alive the contributory pensions scheme and the sick and benefit club of the Southgate workmen.

With regard to the proposed power to charge 1d. per therm more in the area of the Southgate Company than in the inner Tottenham area, Counsel said that that power was purely permissive, and an amendment had been made to the Draft Order, providing that after three years from the date of the Order the Board of Trade could revise that differential or do away with it, on the application of the Company or appropriate local authority. The history of the Tottenham Company, he said, showed that its policy was to reduce differential charges in required areas as soon as it could do so with fairness to both existing and new consumers.

With regard to the basic price of 11d., as proposed in the Draft Order, the objectors had rightly stated that it should be justified. It had been discussed with the objectors, and those who had withdrawn their objections were satisfied with the figures. The Company had promised that copies of any table or calculations placed before the Board of Trade in support of the proposed basic price of 11d. per therm would be furnished to the authorities, to assist them if they wished in the future to apply for a revision of the basic price.

A clause was inserted in the Draft Order whereby differential charges in certain areas within the present limits of supply of the Tottenham Company, which charges were made compulsory in 1935, were to be made purely permissive in the future. That gave effect to an undertaking which the Company had given the County Councils in 1935.

Mr. H. F. BIDDER (for the Finchley Borough Council) said that his only outstanding objection related to the proposed power to charge not more than 1d. per therm extra in the Southgate Company's area as compared with the inner Tottenham area.

Mr. ABADY said the Council had expressed the view that there should be a standard rate throughout the whole area of supply;

and also that inasmuch as the portion of Finchley which was within the Southgate Company's area of supply was fully developed already, it would not be necessary for the Tottenham Company, after having acquired the Southgate Undertaking, to expend large sums on mains which would remain unremunerative for several years. The justification for the proposed differential, however, was that there was practically 1d. per therm difference in the capital cost of supplying in the Southgate Company's district as in the inner Tottenham district; it was felt that the consumers in the Southgate Company's district should continue to bear that extra cost for some time, as, in fact, they did to-day.

Dealing with the objection of the Enfield U.D.C. to the proposed differential charge in the Southgate Company's area, he said that at present some consumers in Enfield were buying from the Tottenham Company and some from the Southgate Company. In 1936 the quantity bought by Enfield consumers from the Tottenham Company was 740 million cu.ft., or 16·84% of the total make of the Tottenham Company; but only 13 million cu.ft. was sold to Enfield consumers by the Southgate Company. The extra 1d. per therm on the 13 million cu.ft. represented a very small amount. The point was that a differential was justified on the ground of increased cost of supply in one district as compared with another, and if that higher element of cost were not met by a differential charge on the consumers concerned, obviously it must be imposed partly on consumers in other parts of the area of supply. Inasmuch as the greater part of the consumers of gas in Enfield stood to be shot at if there were no differential, he wondered whether the U.D.C. still wished to object to the differential.

Mr. LAUDER (for Enfield U.D.C.) said he would like to see all the figures. The Council also asked for justification of the powers sought with regard to basic price, division of profits, &c.

Mr. *George Evetts* (Consulting Engineer, Westminster), who had advised the Tottenham Company with regard to basic price and dividend, &c., gave evidence. He said that the mains of the two companies practically joined at many points, and there were good physical and geographical reasons why the two companies should amalgamate.

Witness submitted a detailed table to justify the proposed basic price of 11d. per therm, and a table setting out the capital and borrowing powers of the companies before and after amalgamation.

Mr. BIDDER (for Finchley Borough Council), cross-examining as to the justification for the differential charge, said he had calculated from the 1936 accounts that the revenue required for the capital return, divided by the number of therms sold, was 1·6d. per therm for the Southgate Company and 1·44d. per therm for the Tottenham Company. If that were so, he said, there was no justification for the proposed differential.

Mr. *Evetts* replied that it was not strictly correct to say that the difference in capital charges justified the whole 1d.; it was the difference in the net revenue charge, in other words, the charge in the profit and loss account.

Mr. LAUDER (for the Enfield U.D.C.) asked whether the amalgamation would result in a saving of administrative expenses.

Mr. *Evetts* replied that it would eventually, but the immediate saving would be very little.

In the course of further cross-examination, Mr. Lauder asked for more information and for further time in which to consider it. At Mr. Ronca's suggestion, therefore, the proceedings were adjourned until Tuesday, Jan. 25.

New Patents

Applications

BRITISH BRASS FITTINGS, LTD., AND SPERRYN, G. N.—Thermostatically controlled gas valves. No. 994.

DEAN, W.—Gas-burning heaters. No. 770.

EVERED & CO., LTD., AND PINKESS, L. H.—Control means for gas water heaters. No. 980.

GENERAL GAS APPLIANCES, LTD., AND COLEMAN, F. S.—Gas burners for stoves. No. 602.

MAIN, LTD., R. & A., AND WORTLEY, G. W.—Fires with heat radiating elements. No. 727.

UNITED GAS INDUSTRIES, LTD., SMITH, E. W., SMITH, D. G., CHRISTIAN, A. C., AND CHRISTIAN, A. J.—Prepayment mechanisms for gas meters. No. 887.

WILSON GAS METERS, LTD., G., WILSON, J. H., AND POOLE, D. C. E.—Prepayment mechanism gas meters.

Complete Specifications Accepted.

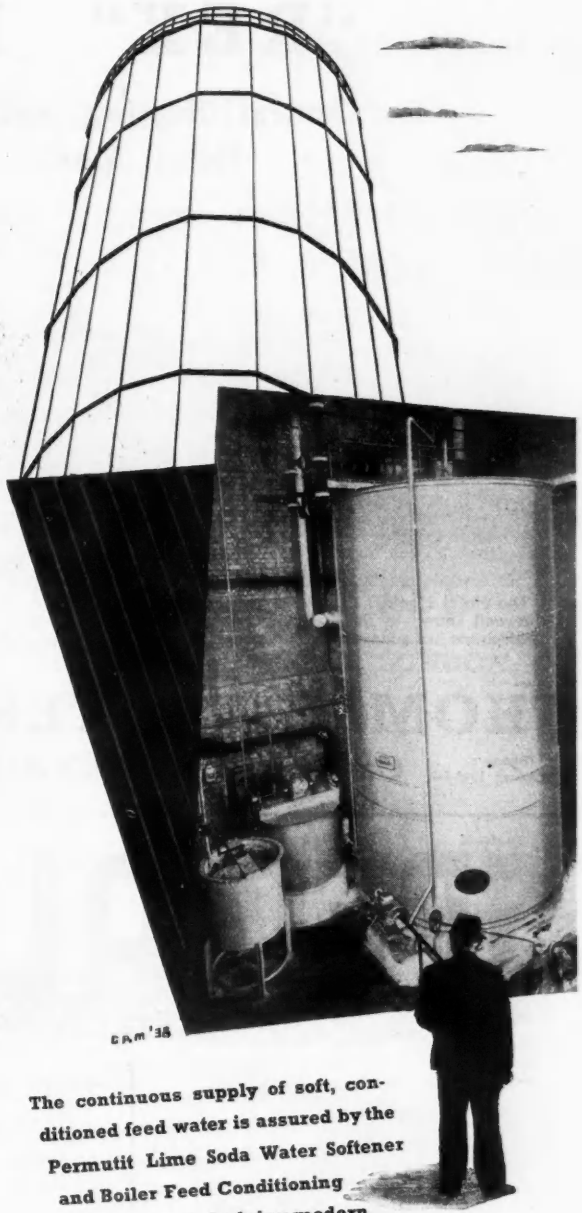
MAIN, LTD., R. & A., AND ROBINSON, H. N.—Gas fires provided with lighters. No. 477,959.

GLOVER & CO., LTD., T., AND WILSON, J. S.—Gas Meters. No. 477,704.

MAIN, LTD., R. & A., AND WORTLEY, G. W.—Gas burners. No. 477,713.

TOWNSON & COXSON, LTD., AND DAVIS, N.—Gas pendants. No. 477,933.

BRITISH BRASS FITTINGS, LTD., AND SPERRYN, G. N.—Gas cut-off valves. No. 477,812.



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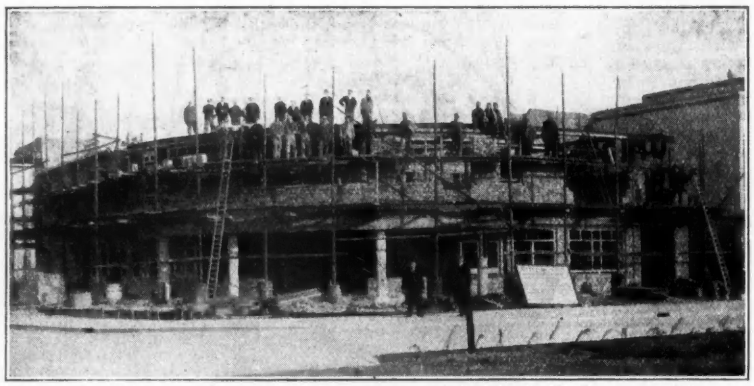
PERMUTIT

"REX" BOILERS

for Central Heating and Hot Water Supply at the Hotel Monico, Canvey Island



The Hotel Monico, Canvey, is being constructed by Mr. A. H. Beaumont (who is well known to the Gas Industry) following the building of "The Casino" which has had a most successful career under his ownership and control since 1934.

For warming the Hotel a No. 1 Series "Rex" Boiler of 6 sections has been installed which heats 25 Radiators containing 1,000 sq. ft. nett direct surface.

For Hot Water Supply, a "Rex" 'D' Series 4-Section Gas Water Heater is installed, with a storage of 300 galls. capacity in twin cylinders of 150 galls. each, so arranged with cut-out that one or both can be used according to demand. This supplies hot water to hand basins in each bedroom, bathrooms, public lavatories, culinary sinks and bar wells.

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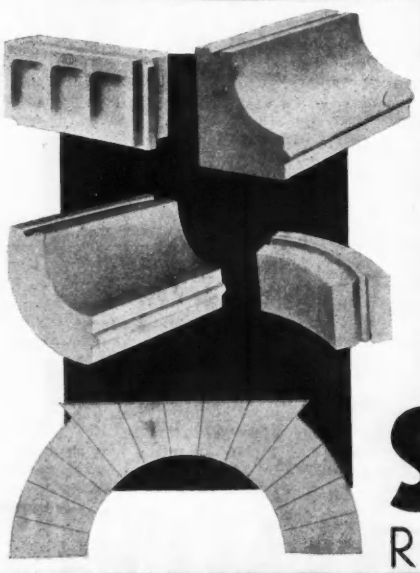
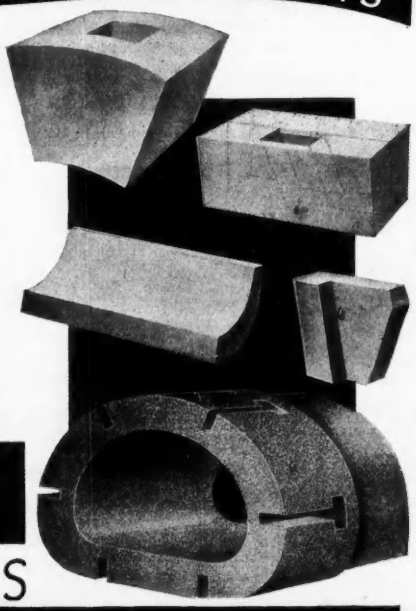


THE high standard of finish, accuracy of size, and degree of burning, which are characteristic of "BLUEBELL" (95% silica) special shapes for vertical and horizontal retorts, as also of "THISTLE" fireclay mouthpieces, etc. is fully maintained by the control which is a feature of their manufacture.



STEIN

REFRACTORIES

JOHN G. STEIN & Co LTD *Bonnybridge Scotland*

Markets and Manufactures

Current Sales of Gas Products

The London Market

There are a few changes to record in the prices of Tar Products in the London market, values being as under:

Pitch, 38s. per ton f.o.b.
Creosote, 5⅞d. to 6d.
Refined tar, 3¼d.
Pure toluole, about 2s. 3d.
Pure benzole, 1s. 9d.
95/160 solvent naphtha, 1s. 7d. to 1s. 8d.
90/160 pyridine, 10s. to 11s.
All per gallon naked at makers' works.

The Provinces

Jan. 24.

The average prices of gas-works products during the week were: Gas-works tar, 24s. to 29s. Pitch—East Coast, 38s. to 39s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 38s. to 39s.* Toluole, naked, North, 1s. 8d. to 1s. 9d. Coal tar, crude naphtha, in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 1s. 5½d. to 1s. 6d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅞d. to 4½d. Heavy oils, in bulk, North, 5d. to 5¼d. Carbolic acid 60's, 3s. 3d. to 3s. 6d. Naphthalene, £13 10s. to £16. Salts, 80s. to 85s., bags included. Anthracene, "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Scotland

GLASGOW, *Jan.* 22.

Business is still rather restricted, but prices show no material alteration during the week.

Crude gas-works tar.—Actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch is slightly easier at 28s. to 30s. per ton, f.o.b. for export, and round 28s. per ton *ex* works in bulk for home trade.

Refined tar.—Price for home consumption is fixed at 3½d. to 4d. per gallon, and for export value is called 3d. to 3¼d. per gallon, both *ex* works in buyers' packages.

Creosote oil.—A small but steady business is being conducted at the following prices: Specification oil, 5d. to 5¼d. per gallon; low gravity, 6d. to 6¼d. per gallon; neutral oil, 5d. to 5¼d. per gallon; all *ex* works in bulk.

Cresylic acid.—There is still a lack of enquiry for this product, but quotations are maintained as under: Pale, 97/99%, 3s. to 3s. 3d. per gallon; dark, 97/99%, 2s. 9d. to 3s. per gallon; and pale, 99/100%, 3s. 6d. to 4s. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—Production is well looked after at 6d. to 6¼d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is changing hands at 1s. 5½d. to 1s. 6¼d. per gallon, and 90/190 heavy naphtha at 1s. to 1s. 1d. per gallon.

Motor benzole remains steady at 1s. 4¼d. per gallon.

Pyridine.—To-day's values are 12s. to 12s. 6d. per gallon for 90/160 grade, and 13s. to 14s. per gallon for 90/140 grade.

Benzole Prices

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole..	0 9½	to	0 10	per gall. at works
Motor „ ..	1 3	„	1 3½	„ „ „
90% „ ..	1 4	„	1 4½	„ „ „
Pure „ ..	1 8	„	1 8½	„ „ „

Contracts Advertised To-Day

Mantles.
Port Talbot Gas Department. [p. 270.]

Meters.
Port Talbot Gas Department. [p. 270.]

New Workshops and Buildings.
Spenborough Gas Department. [p. 270.]

Pipes and Fittings.
Port Talbot Gas Department. [p. 270.]

Stores.
Port Talbot Gas Department. [p. 270.]

Van Body and Tower Wagon.
Wallasey Gas Department. [p. 270.]

Metropolitan Companies' Dividends

Commercial.—Final dividend of 2½% (less income-tax) on the ordinary stock, making 5% for 1937 (unchanged).

Gas Light and Coke.—Final dividends at the rates per annum of £4 on the 4% consolidated preference stock, £3 15s. on the 3¼% redeemable preference stock 1970, £3 10s. on the 3½% maximum stock, and £5 12s. on the ordinary stock (unchanged). £102,376 is carried forward.

South Suburban Gas Company.—Final dividends of 3% on the ordinary stock, making 6% for 1937 (unchanged).

Wandsworth.—Final dividends of 3½% on the consolidated stock, making 7% for the year (unchanged), and 2% on the 4% preference stock, making 4% for the year.

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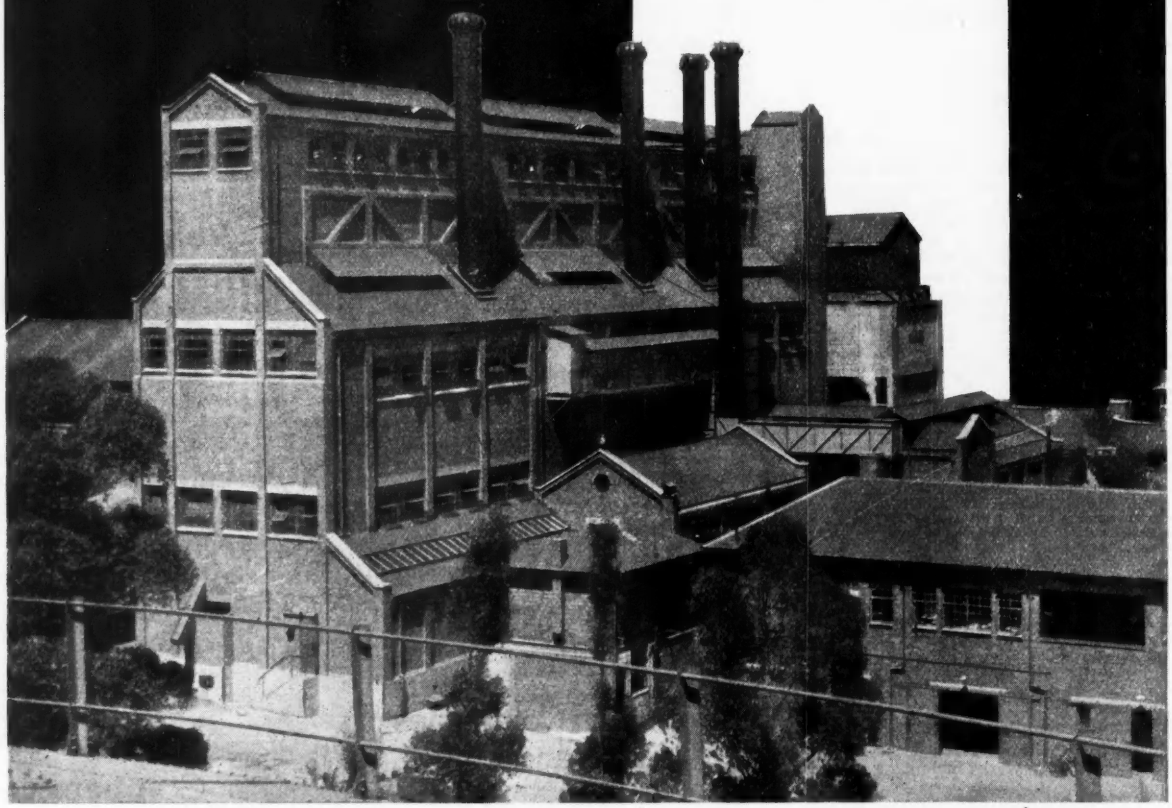
Glover-West

MODERN VERTICAL RETORT PLANTS



JOHANNESBURG S.A.

Since the complete new Cottesloe Gas Works was built for the Johannesburg Council by the West organisation in 1928, the original 18-retort battery of Glover-West verticals has been trebled. The third unit recently put into service is foremost in the picture. It brings the total retorts to 54 and the total production capacity of this typically modern works to 4½ million cubic feet.

Carbonizing plants of West design and construction represent to-day's methods of gas manufacture all over the world. The 414 plants built or in progress are distributed over 24 countries.

WEST'S GAS IMPROVEMENT CO. LTD. • MILES PLATTING • MANCHESTER 10

GAS STOCKS AND SHARES

Business on the Stock Exchange last week was comparatively small in volume and prices moved within narrow limits. Dealers were somewhat short of supplies and, as was evidenced by the home rail market, support in any direction, however small, was sufficient to cause a rise in prices. Gilt-edged securities maintained their values, but industrials were irregular in the absence of support. Rubber and tea shares made some headway; oils were dull. Some speculative buying continued in gold-mining shares. In view of the strong trade position at home it is unfortunate that Stock Exchange business should be continually adversely influenced by events abroad, but investors are closely watching the situation, particularly with regard to America, and given any tangible signs of improvement anywhere in the existing unsettled state of affairs, active conditions should speedily be resumed.

Having regard to the general inactivity the Gas market was well supported, though with few exceptions prices remained unchanged. A satisfactory feature was the recovery after a long period of reaction in Commercial ordinary stock. At one time last week the quotation dropped to 75-85, but on the dividend announcement the price was marked up 5½ points to 83-88. At the time of writing, £10,000 of this stock is on offer at 88 yielding £5 13s. 7d.%. South Metropolitan ordinary was also marked up another point to 104½. Apart from *ex* div. adjustments, the only reaction in the Official List was a drop of 3 points in Alliance and Dublin ordinary to 159½.

On the provincial Exchanges, Newcastle units closed 3d. higher at 23s. 9d., while in the Supplementary List the nominal quotation of Hampton Court consolidated dropped 5 more points to 150.

The dividend announcement season is now upon us, and among the first to appear are the following, all of which are at the same rates as a year ago:

	Final.	Year 1937.
	%	%
Commercial..	2½	5
Gas Light	£2 16s.	£5 12s.
South Suburban	3	6
Wandsworth	3½	7

Official Quotations on the London Stock Exchange

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 21.	Rise or Fall on Week.
1,767,439	Sept. 6	8	8	Alliance & Dublin Ord. ...	157—162	−3
374,000	Dec. 13	4	4	Do. 4 p.c. Deb. ...	95—100	...
558,890	Aug. 9	7	7	Barnet Ord. 7 p.c.	158—163	...
300,000	Oct. 49	1/9⅔	1/4⅓	Bombay, Ltd.	26/—28/—	...
179,915	Aug.	9⅓	9⅓	Bournemouth sliding scale ...	200—205	...
590,407	,,	7	7	Do. 7 p.c. max. ...	158—163	...
493,960	,,	6	6	Do. 6 p.c. Pref. ...	133—138	...
50,000	Dec. 13	3	3	Do. 3 p.c. Deb. ...	78—83	...
262,025	,,	4	4	Do. 4 p.c. Deb. ...	98—103	...
335,000	,,	5	5	Do. 5 p.c. Deb. ...	115—120	...
357,900	Aug. 9	7½	7½	Brighton, &c., 6 p.c. Con. ...	150—155	...
649,955	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	133—138	...
205,500	,,	6	6	Do. 6 p.c. 'B' Pref.	127—133	...
855,000	Sept. 20	8	7	British Ord.	139—144	...
100,000	Dec. 13	7	7	Do. 7 p.c. Pref.	140—145	...
350,000	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	110—115	...
120,000	,,	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...
450,000	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107	...
450,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
100,000	22 May'33	6	4	Cape Town, Ltd.	1½—2½	...
100,000	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1½—3½	...
150,000	Dec. 13	4½	4½	Do. 4½ p.c. Deb. ...	70—75	...
626,860	July 19	6	6	Cardiff Con. Ord.	125—130	...
237,860	Dec. 13	5	5	Do. 5 p.c. Red. Deb.	106—111	...
98,936	Oct. 4	2/-	2/-	Colombo Ord....	1⅞—1⅞	...
24,510	,,	1/4½	1/4½	Do. 7 p.c. Pref.	23/6—25/6	...
739,453	Oct. 4	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	17/—19/—	...
296,144	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/—	...
1,775,005	Aug. 9	5	5	Commercial Ord.	83—88	+3
620,000	Nov. 29	3	3	Do. 3 p.c. Deb. ...	73—78	...
286,344	Aug. 23	5	5	Do. 5 p.c. Deb. ...	113—118	...
807,560	Aug. 9	7	7	Croydon sliding scale... ...	140—145	...
644,590	,,	5	5	Do max. div.	110—113	...
620,385	Dec. 13	5	5	Do. 5 p.c. Deb.	112—117	...
239,000	Aug. 9	5	5	East Hull Ord. 5 p.c....	98—103	...
185,355	Aug. 9	6	6	East Surrey Ord. 5 p.c. ...	120—125	...
176,211	Dec. 13	5	5	Do. 5 p.c. Deb. ...	112—117	...
250,000	Nov. 15	7	4	Gas Consolidation Ord. ...	19/6—21/6	...
250,000	,,	4	4	Do. 4 p.c. Red. Cum. Pref.	18/6—20/6	...
19,255,284	Aug. 9	5⅓	5⅓	Gas Light & Coke 4 p.c. Ord.	24/3—25/3*a*	...
2,600,000	,,	3½	3½	Do. 3½ p.c. max. ...	83—86	...
4,477,106	,,	4	4	Do. 4 p.c. Con. Pref	100—103	...
2,993,000	Jan. 17	...	3½	Do. 3½ p.c. Red. Pref.	101—103*	−1
8,602,497	Nov. 29	3	3	Do. 3 p.c. Con. Deb.	79½—82½	+1½
3,642,770	,,	5	5	Do. 5 p.c. Red. Deb.	112—115	...
3,500,000	,,	4½	4½	Do. 4½ p.c. Red. Deb.	110—113	...
700,000	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb.	98—101	...
270,466	Aug. 23	6	6	Harrogate New Cons. ...	115—120	...
157,500	April 5	1/2⅝	1/2⅝	Hong Kong and China Ord	1—1½	...
213,200	Aug. 9	6	6	Hornsey Con. 3½ p.c. ...	118—123	...
5,600,000	Nov. 1	12	8	Imperial Continental Cap. ...	133—138	...
223,130	Jan. 17	3½	3½	Do. 3½ p.c. Red. Deb. ...	88—93*	−1
285,242	Aug. 9	8½	8½	Lea Bridge 5 p.c. Ord. ...	170—175	...
11,751	Aug. 23	10	8	Maidstone 5 p.c. Cap.... ...	180—190	...
63,480	Dec. 13	3	3	Do. 3 p.c. Deb. ...	70—75	...
75,000	Nov. 29	†10	†10	Malta & Mediterranean ...	145—155	...
				Metropolitan (of Melbourne)		
392,000	Oct. 1	5½	5½	5½ p.c. Red. Deb.	100—103	...
231,978	Aug. 23	5	5	M.S. Utility 'C' Cons. ...	101—106	...
968,657	,,	4	4	Do. 4 p.c. Cons. Pref.	96—101	...
360,075	Dec. 13	4	4	M.S. Utility 4 p.c. Deb. ...	97—102	...
148,955	,,	5	5	Do. 5 p.c. Deb. ...	112—117	...
675,000	Nov. 15	†9	†6	Montevideo, Ltd.	85—90	...
250,000	Aug. 9	7½	7½	North Middlesex 6 p.c. Con.	147—152	...
396,160	Aug. 9	5	5	Northampton 5 p.c. max. ...	110—115	...
300,000	Oct. 18	†7	†9	Oriental, Ltd.	153—158	...
468,537	Dec. 13	8	8	Plymouth & Stonehouse 5 p.c.	154—159	...
621,667	Aug. 9	8½	8½	Portsmouth & Gosport Cons.	164—169	...
241,446	,,	5	5	Do. 5 p.c. max. ...	104—109	...
73,350	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...
247,966	Dec. 13	4	4	Primitiva 4 p.c. Cons. Deb. ...	98—103	...
625,959	Jan. 17	4	4	Do. 4 p.c. Red. Deb. ...	95—100*	...
15,000	Sept. 6	6	6	San Paulo 6 p.c. Cum. Pref. ...	9—9½	...
441,275	Sept. 20	1/1½	1/1½	Severn Val. Gas Cor. Ld. Ord.	21/6—23/6	...
460,810	,,	-/10⅛	-/10⅛	,, ,, 4½ p.c. Cum. Pref.	19/6—21/6	...
9,000	June 7	4	4	South African Ord.	3¾—4¾	...
1,371,752	Sept. 6	1/2⅞	1/2⅞	South East'n Gas Cn. Ld. Ord.	23/—25/—	...
871,636	,,	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pref.	20/—22/—	...
498,818	,,	4	4	Do. 4 p.c. Cum. Pref. ...	18/—20/—	...
450,000	Aug. 9	4	4	Do. 4 p.c. Deb.	99—102	...
150,000	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...
6,709,895	Aug. 9	6	5	South Met. Ord.	103—106	+1
1,135,812	,,	6	6	Do. 6 p.c. Irred. Pf. ...	131—136	...
850,000	,,	4	4	Do. 4 p.c. Irred. Pf. ...	98—101	...
1,895,445	Dec. 13	3	3	Do. 3 p.c. Deb. ...	74—79	...
1,000,000	Jan. 17	5	5	Do. 5 p.c. Red. Deb....	109—112*	−1
1,543,795	Aug. 9	6	6	South Suburban Ord. 5 p.c. ...	120—125	...
512,825	,,	5	5	Do. 5 p.c. Pref....	110—115	...
500,000	,,	4	4	Do. 4 p.c. Pref....	95—100	...
250,000	,,	...	§18/9	Do. 3⅜ p.c. Red. Pref.	98—101	...
888,587	Dec. 13	5	5	Do. 5 p.c. Deb....	113—118	...
250,000	,,	4	4	Do. 4 p.c. Deb....	97—100	...
200,000	Sept. 20	...	3½	Do. 3½ p.c. Red. Deb.	94—99	...
427,859	Nov. 1	1/2⅞	9⅔	S. Western Gas & Water Ord.	18/6—20/6	...
160,523	,,	-/10⅛	-/10⅛	Do. 4½ p.c. Red. Cum. Pf.	19/6—21/6	...
110,000	Dec. 13	4	4	Do. 4 p.c. Red. Deb. ...	97—102	...
750,541	Aug. 9	5½	5	Southampton Ord. 5 p.c. ...	111—116	...
148,836	Dec. 13	4	4	Do. 4 p.c. Deb.	96—101	...
350,000	Aug. 23	5½	5½	Swansea 5½ p.c. Red. Pref. ...	110—115	...
94,000	Jan. 3	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100*	...
1,076,490	Aug. 9	6½	6½	Tottenham and District Ord.	131—136	...
409,835	,,	5½	5½	Do. 5½ p.c. Pref....	121—126	...
62,235	,,	5	5	Do. 5 p.c. Pref....	109—114	...
371,850	Dec. 13	4	4	Do. 4 p.c. Deb....	97—102	...
85,701	July 19	‡6	6	Tuscan 5 p.c. Red. Deb. ...	96—101	...
888,629	Oct. 4	6	4	U. Kingdom Gas Cor. Ord....	19/—21/-	...
937,743	Nov. 15	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/—	...
500,000	,,	...	-/1·15	Do. 4 p.c. 1st Red. Cum. Pf.	19/—21/-	...
745,263	Dec. 13	4½	4½	Do. 4½ p.c. 2nd Non-Cum.Pf.	16/6—18/6	...
1,000,000	Sept. 20	3½	3½	Do. 3½ p.c. Red. Deb. ...	96—99	...
373,939	Aug. 9	7	7	Uxbridge, &c., 5 p.c.	138—143	...
133,010	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...
1,371,138	Aug. 9	7	7	Wandsworth Consolidated ...	140—145	...
2,525,768	,,	4	4	Do. 4 p.c. Pref. ...	99—102	...
1,343,964	Dec. 13	5	5	Do. 5 p.c. Deb. ...	113—118	...
383,745	,,	4	4	Do. 4 p.c. Deb. ...	97—102	...
558,342	Aug. 9	7	7	Watford and St. Albans Ord.	140—145	...
200,000	,,	5	5	Do. 5 p.c. Pref. ...	109—114	...
200,000	,,	5½	5½	Do. 5½ p.c. Pref. ...	121—126	...
200,000	Nov. 29	4	4	Do. 4 p.c. Red. Deb.	95—100	...
100,000	,,	3½	3½	Do. 3½ p.c. Red. Deb.	94—99	...

a.—The quotation is per £1 of stock. * Ex. div. † Paid free of income-tax ‡ For year. Actual.

Supplementary List and Provincial Exchanges overleaf.

STOCK AND SHARE LIST—Cont.

Supplementary List, not Officially Quoted, London

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations Jan. 21.	Rise or Fall on Week.
202,152	Sept. 6	25/-*b*	5	Ascot Ord.	100—105	...
128,182	Dec. 13	5	5	Do. 5 p.c. Pref.	108—113	...
573,156	Nov. 15	5	5	Assd. Gas and Water Ord. ...	19/—21/-	...
167,506	,,	...	-/4c	Do. 4 p.c. Red. Cum. Pref.	19/—20/-	...
253,118	,,	...	4	Do. 4 p.c. Irred. Pref. ...	18/—20/-	...
500,000	,,	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	19/—21/-	...
500,000	Sept. 6	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...
31,035	Aug. 23	...	-/4½	Associated Utilities 4 p.c. Pref.	16/6—18/6	...
100,000	Dec. 13	...	3½	Do. 3½ p.c. Red. Deb....	95—100	...
17,000	Aug. 23	8	8	Bognor Orig. Ord. 'A' ...	160—170	...
62,210	,,	8	8	Do. New Addl. 'A' ...	160—170	...
87,160	,,	7	7	Do. New 7 p.c. max. ...	141—146	...
37,440	Aug. 9	10	10	Cam. Univ. & Town10 p.c. max.	193—203	...
125,970	,,	7	7	Do. 7 p.c. max.	135—140	...
39,025	,,	5	5	Do. 5 p.c. max.	98—103	...
65,000	Aug. 9	8½	7½	Eastbourne 'A' 5 p.c. ...	158—163	...
198,000	,,	7	6	Do. 'B' 3½ p.c.	128—133	...
112,312	,,	5	5	Do. 5 p.c. Pref.	108—113	...
130,000	Dec. 13	5	5	Do. 5 p.c. Deb.	113—118	...
24,000	Aug. 23	8½	8½	Great Yarmouth 8½ p.c. max.	44—49	...
59,400	,,	7½	7½	Do. 7½ p.c. max.	34—39	...
51,160	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	120—125	...
152,600	Sept. 6	9	8	Guildford Cons.	170—175	...
54,055	,,	5	5	Do. 5 p.c. Pref.	110—115	...
68,250	Dec. 13	5	5	Do. 5 p.c. Deb.	112—117	...
156,600	Aug. 23	7½	7½	Hampton Court Cons. ...	145—155	- 5
73,620	Sept. 6	8½	8½	Luton Cons. 'A'	163—168	...
107,960	Sept. 20	5½	4	Mid Kent Ord.	8½—9½	...
230,940	Aug. 9	10	10	Oxford & District Ord. ...	205—210	...
47,112	,,	5	5	Do. 5 p.c. Pref.	108—113	...
50,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	110—115	...
126,193	Nov. 15	7½	7½	Peterborough Ord.	158—163	...
64,990	Sept. 6	7½	6½	Redditch Ord....	125—135	...
166,850	Aug. 9	8	8	Romford Ord....	155—160	...
60,000	,,	4	4	Do. 4 p.c. Pref.	97—100	...
44,000	Sept. 20	5	5	Do. 5 p.c. Deb.	113—118	...
25,570	Aug. 9	5½	5½	Rugby 5½ p.c. Pref.	125—130	...
25,000	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...
42,750	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	120—125	...
10,950	Aug. 23	8	8	Ryde Ord.	158—163	...
270,086	Sept. 6	7	7	Slough Ord.	133—138	...
21,000	Dec. 13	5	5	Do. 5 p.c. Deb.	110—115	...
28,872	Nov. 1	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...
28,866	Sept. 6	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...
137,730	Aug. 9	7	7	Southgate & Dist. 7 p.c. max.	140—145	...
62,500	,,	5	5	Do. 5 p.c. Pref.	110—115	...
117,228	Aug. 23	5	5	Swindon Cons.	106—111	...
60,425	Dec. 13	5	5	Do. 5 p.c. Deb.	110—115	...
64,380	Dec. 13	5	5	Torquay and Paignton 5 p.c. Pf.	108—113	...
33,858	Nov. 15	...	-/2·70c	United Kingdom Gas Corpn. 4½ p.c. 1st Cum. Pref. ...	20/—22/-	...
130,000	Aug. 9	8	5	Wakefield Ord.	120—125	...
81,650	,,	5	5	Do. 5 p.c. max.	103—108	...
82,000	Aug. 9	6	6	Weymouth Ord.	103—108	...
98,384	Aug. 9	6	6	Wolverhampton 6 p.c. Pref....	120—125	...
160,000	Dec. 13	5½	5½	Do. 5½ p.c. Rd. Db.	107—112	...
90,000	Dec. 13	5	5	York 5 p.c. Red. Deb.... ...	104—109	...
133,640	July 19	6¼	6¼	Yorktown (Cam.) 5 p.c. Cons.	128—133	...
120,000	,,	5	5	Do. 5 p.c. Pref.	108—113	...
35,000	Dec. 13	5½	5½	Do. 5½ p.c. Deb.	121—126	...

BRISTOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Jan. 21.	Rise or Fall on Week.
347,756	July 19	6	5	Bath Cons.	120—122	...
1,667,250	July 19	5	5	Bristol, 5 p.c. max.	117—118	...
120,420	Dec. 13	4	4	Do. 1st 4 p.c. Deb. ...	100—102	...
217,870	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100—102	...
328,790	,,	5	5	Do. 5 p.c. Deb.	119—122	+ 1
274,000	July 19	5	5	Newport (Mon.) 5 p.c. max....	100—102	...
13,200	Sept. 6	8	7	Pontyp'l Gas & W. 10 p.c. 'A'	13—14	...
13,600	,,	6	5	Do. 7 p.c. 'B'	11⅞—12⅜	...
40,000	,,	6	5	Do. 7 p.c. 'C'	11⅞—12⅜	...
140,778	Aug. 9	5	5	Weston-super-Mare Cons. ...	110—112	...
64,338	Jan. 3	4	4	Do. 4 p.c. Deb.	94½—96½	...
33,340	,,	7½	7½	Do. 7½ p.c. Deb.	154—157	...

LIVERPOOL EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Jan. 21.	Rise or Fall on Week.
157,150	Aug. 9	6½	5	Chester 5 p.c. Ord.	106—110	...
92,500	Dec. 13	4	4	Do. 4 p.c. Pref.	96—100	...
36,430	,,	3½	3½	Do. 3½ p.c. Deb.	88—91	...
41,890	,,	4	4	Do. 4 p.c. Red. Deb. ...	97—101	...
2,167,410	Aug. 23	6	6	Liverpool 5 p.c. Ord.... ...	125½—127½	...
245,500	Dec. 13	5	5	Do. 5 p.c. Red. Pref. ...	99—104	...
306,083	July 1	4	4	Do. 4 p.c. Deb. ...	102—104	...
106,280	Aug. 9	10	10	Preston 'A' 10 p.c.	206—216	...
188,219	,,	7	7	Do. 'B' 7 p.c.	147—157	...

NEWCASTLE EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Jan. 21.	Rise or Fall on Week.
122,577	Aug. 9	8	8	Blyth 5 p.c. Ord.	165—166	...
732,000	Aug. 9	5	5	Hartlepool G. & W. Cn. & New	112—114	...
2,061,315	Aug. 9	5½	5	Newcastle & Gateshead Con.	23/6—24/-*a*	+-/3
682,856	,,	4	4	Do. 4 p.c. Pref. ...	98—100	...
776,706	Jan. 3	3½	3½	Do. 3½ p.c. Deb. ...	89½—90½*	...
277,285	Nov. 1	5	5	Do. 5 p.c. Deb. '43...	103—105	...
332,351	Aug. 23	6	6	Sunderland 6 p.c. max. ...	140—142	...

NOTTINGHAM EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Jan. 21.	Rise or Fall on Week.
542,270	Aug. 9	9	6	Derby Con.	135—145	...
55,000	Dec. 13	4	4	Do. 4 p.c. Deb. ...	100—105	...
20,000	Dec. 13	5	5	Long Eaton 5 p.c. Pref. ...	10—12	...
80,000	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...

SHEFFIELD EXCHANGE

Issue. £	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations, Jan. 21.	Rise or Fall on Week.
10,000	Sept. 20	10	10	Great Grimsby 'A' Ord. ...	210—220	...
6,500	,,	10	10	Do. 'B' Ord. ...	210—220	...
79,000	,,	10	10	Do. 'C' Ord. ...	205—210	...
1,806,339	Aug. 23	6	6½	Sheffield Cons.	144—148	...
95,000	Jan. 3	4	4	Do. 4 p.c. Deb.	100—103	...

a The quotation is per £1 of Stock. Actual for Quarter. *c* Actual. * Ex div.

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